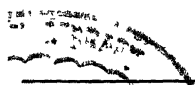


HUMAN BEHAVIOR

Psychology as a Bio-Social Science

LAWRENCE E. COLE, *Oberlin College*



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FOREWORD

To understand another human being is as difficult a task as a man can choose. A psychology that strives to be adequate to this end must be a heavy borrower—medicine, biology, sociology and anthropology, and even the fine arts and philosophy must be called upon. And these borrowings need to be interpreted in the light of the findings of a young and growing science, while at the same time our sights are trained upon the goal of an adequate understanding of human behavior.

In organizing the materials of psychology there is a temptation to proceed logically, to begin with cells and organs and to arrive finally at the whole man in action. Yet experience teaches that parts, presented as parts, often remain isolated and unassimilated at the end. For this reason the treatment of the nervous system has been embedded in the various chapters where it seems germane to the problems being discussed. The glands appear in the sections on growth and development, and the sense organs and muscles are treated in conjunction with those problems where a knowledge of their structure and function seems required.

Similarly the clinical emphasis appears, not in a special section, but in the numerous case studies, in the measurements and observations of the behavior of patients, and in the emphasis upon the whole individual which recurs in each section. The borrowings from sociology and anthropology are likewise fused with the material of each section, and a leaf is taken from the Gestalt book in that we have approached this larger configuration early, before proceeding to the task of analysis. It is within the field of the culture that the individual develops. Indeed, our very problem—the psychology of human behavior—is peculiarly a problem of our time.

A special word seems required to justify the devotion of such a large section to the dynamics of the self-system, and, especially, to psychoanalysis. In part, this extensive treatment is justified by the rise of clinical psychology in the past twenty-five years, in part by the fact that the spread of the psychoanalytic interpretation of life has affected every phase of our thinking. Even our students approach psychology knowing—in advance—that it is about dreams, neuroses, the unconscious mind, and that it explains the vicissitudes of our sexual life. Such a state of affairs requires that psychoanalysis be

given every consideration and, at the same time, that it be made to stand examination in that scientific court of validation where every hypothesis must be tested

The final chapter, on the normal personality, represents an attempt at integration, at pointing up those questions that the student might well face when, at last, he has worked his way through a sizable body of facts. How can we use them. . .and what for?

If we begin our study of psychology with the hope that the effort to reach a scientific understanding of human behavior may contribute to the task of producing better human beings, it seems fitting to conclude with a discussion of those personal and moral problems each of us faces as he considers his own distance from that ideal goal.

LAWRENCE E. COLE

NOTE

In this volume the following system of footnotes and reference notes has been used: Quotations of 50 words or more are acknowledged by footnotes. Shorter quotations, summaries of experimental data, references to authors, publications, studies, and the like, are followed by superior figures. These figures direct the reader to the *References* at the end of each chapter. In the Index of Names, all mentions of an author's work have been listed, whether in the text proper or in the *References*, although in some instances an author's name does not appear on the text page where his work is discussed. In such cases the reference figure indicates that the author and title may be found at the end of the chapter.

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PART ONE

The Nature of the Psychological Problem

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CHAPTER 1

The Nature of the Psychological Problem

We may catch a glimpse of the nature of the science of psychology if we look about, for a moment, to see where psychologists are at work. We can find them at the military air base where future pilots are being selected and trained, attempting to discover the qualities of the good pilot and to find measures for those capacities whose presence or absence will spell success or failure at the end of a long, arduous, and expensive course of training. There are psychologists in the preparatory schools and colleges who administer tests designed to measure the scholastic aptitude of applicants for admission, attempting to predict which applicants will prove good academic risks, if admitted. And in the personnel offices of industry and government psychologists are at work testing and placing applicants according to their aptitudes.

Illustrations of this type could be multiplied. In fact, new applications of psychological tests are arising each year; for wherever there is a need for a long-term estimate of an individual's capacity to accomplish some specific task, a psychological problem arises. These problems are indeed more numerous than our solutions; the recognition of the need for such measurements has grown more rapidly than our supply of adequate instruments. The usefulness of the instruments has been established beyond a doubt; and if the psychologist states that his aim is to discover facts and procedures that will make it possible for him to measure and predict human behavior, and if at the same time he recognizes the imperfections in his present instruments, we can at least grant him working space while he strives to improve the measures.

There are psychologists in the special schools for the training of the blind, the deaf, and the otherwise handicapped child, seeking to understand these special problems, devising special methods of instruction, and the like. There are psychologists in government bureaus, analyzing the effectiveness of the services, devising improved ways of communicating their findings to the public which supports them. Others are busy analyzing consumer's needs, the effectiveness of advertising, the effect of propaganda, the bases of political preferences. In short, wherever there is a problem in understanding, measuring, or influencing the course of human behavior, there the psychologist is apt to be called upon to apply his specialized training.

In addition to these somewhat impersonal methods of procedure, which are adapted to dealing with men in the mass, there are psychological procedures directed toward an understanding of the individual. Psychologists can be found in the nursery school, in the boy's camp, in the mental hygiene clinic, in the personnel office of the department store. Here they are called upon to study the adjustment of the individual to other persons, to locate and diagnose misfits; and they seek, through interviews, tests, or other methods of observation and analysis, to come to an understanding of the causes of the "maladjustment" in order that changes in the handling of the individual, or a program of re-education, may be undertaken. Where the individual who is being studied is sufficiently mature, this task usually involves giving him a fresh understanding of his own interests and capacities, and of the forces that have made him what he is.

There is also a large group of psychologists whose efforts are directed toward teaching and research. Aside from the instructional task of imparting the results of psychological research, the academic psychologists have contributed notably to our basic psychological theory. As a group, these psychologists tend to be interested in processes (for example, learning, perceiving, thinking, reasoning) rather than in individuals, and their work has provided the necessary theoretical foundation upon which most of the applications described above have depended. To this group we owe our norms of human growth and development, and our understanding of the interplay of hereditary and environmental conditions which facilitate and hamper the process of development. They have devised experimental procedures and have introduced quantitative methods into the study of emotions—perhaps the most elusive of all psychological areas—laying bare their physiology as well as their impact upon learning, memory, and reasoning. The laws of learning, perceiving, reasoning which have emerged from their laboratories have led to extensive reforms in educational procedures. They have studied sensory capacities and motor skills, measured scholastic aptitudes and

personality traits, described the first responses of infants and the deteriorative changes of old age. Some of their research has been carried out upon animal subjects, in the search for a complete evolutionary account of human functions (and in the effort to achieve the most rigorous control of the simplest functions). The research techniques of this group have been extended to the study of social groups, both animal and human. Confronted with the task of organizing and transmitting the accumulations of research (and such a journal as *The Psychological Abstracts* covers approximately six thousand titles annually) this group of workers has contributed notably to the organization of psychological theory.

PSYCHOLOGY AS SCIENCE: THE AIMS OF THE PSYCHOLOGIST

This cursory sampling, while quite incomplete as a picture of the extensive field of psychological work, at least gives us an indication of the rather ambitious aims of this infant science. Applied psychology is a kind of human engineering; and, as in other types of engineering, back of these applications there has had to be much painstaking research, the rigorous testing of hypotheses in carefully planned experiments, the laborious collection of data, and much rigorous thinking about the implications and interpretations that arise from the facts.

To many, the very notion of *human engineering* is something to be rejected promptly. It smacks too much of the dictator, they feel, of the manipulator of men, of the smart propagandist and salesman, of the efficiency expert who studies how to get the last ounce of production from the employee. We can almost imagine the men in the Kremlin devising a "line," which—however far from political reality or from the interests of those concerned—will serve to activate the masses in a way consistent with Russian policy. Or we can recall Hitler's psychologists, who set about the task of selecting and measuring those traits possessed by the little Führers whose sergeant-major personalities would unquestioningly carry out the dictator's bidding, or who devised a pageantry and a propaganda so effective that their grip upon the German mind still creates problems that must be overcome before a durable peace is possible. Certainly the understanding of psychological forces, the mastery of techniques that can change as well as measure human behavior, gives a power that can be subject to the very gravest abuses. In this respect psychology is an even more dangerous weapon than

atomic physics, for it invades the inner regions of the self and tampers with the mainsprings of action.

Human curiosity, however, knows no confines; and if the facts and skills possessed by psychologists present these would-be engineers with new ethical problems, psychology—as science—can plead that it is not alone in this respect. Chemistry, physics, and biology are also subject to misuse. The prospect of an adequate scientific foundation for human engineering merely intensifies the need for an adequate awareness of the proper ends for which this knowledge must be used.

The aims of the psychologist, in practice, do not differ from those that actuate other human beings. His study of the reactions of people to advertising can be used to exploit the consumer, his time-and-motion study in the factory can be used as a part of a speed-up program. His study of children with speech defects may result in a new method of training in correct speech, his study of maladjusted individuals in the clinic may lead to an improved mental hygiene program in the schools or to a type of education for parents. As is the case with other students of the natural sciences, his knowledge can be used to exploit and degrade his fellow man, or to promote human welfare.

Perhaps the highest aim to which the psychologist-as-citizen could subscribe is that of releasing human powers and of fighting against the many conditions that serve to degrade and debase human nature. There is a widespread conviction (which most psychologists share) that we have not begun to tap the latent human resources lying everywhere about us—and within us. Our educational institutions reach too few, and many of our techniques are antiquated and inefficient. The condition of man, his ways of living together, of bringing up his children, and of organizing his life, are such that each year 150,000 Americans enter one of our public institutions for the insane.* The general level of our culture is so low that the educated look down with contempt upon the newspapers, the movies, and the pulp magazines, which seem to them to be adapted to a 13-year-old intelligence. The very word “popular” makes the critic suspicious, whether applied to a book or to a public policy. And as we look about us and see the economic and political conflicts, the suspicion and mistrust that exist between nations, races, and classes, we cannot help but feel that there is an unnecessary blight upon our human relations, which prevents the growth of the good society or the development of the ideal type of human being. For the psy-

* This figure indicates that the mental hygiene problem is greater than the problem of preventing accidental death; for this number is greater than the annual total of deaths from poisoning, drowning, railroad accidents, automobile accidents, falling, burning, accidental shooting, etc.

chologist who dares to hope that his studies will help—even a little—to alleviate these conditions and to release those human powers now so stunted, the stakes are high, indeed.

As a specialist in human behavior, the psychologist seeks laws, regularities, recurrences, verifiable knowledge. He wishes to know how children grow up to become the kinds of adults he meets, whether psychopath or normal, stupid or intelligent, good or bad. He must know the effects of differing environments and methods of discipline; and he must discover the nature and degree of plasticity in those genetic factors supplied by each individual's ancestry. Before he can predict what one individual will be like a year from now, he must follow many individuals through this same span of development. Before he can tell how the average consumer will react to an advertisement, or predict how the recruit will react to military service, he must study thousands of individuals as they meet these conditions. Before he can predict he must observe, and he must observe not once but literally thousands of times. Finally, before he can understand the facts revealed by his observations he must weave them into a consistent theory of human behavior, a theory that summarizes and integrates the main findings of investigators and at the same time implies new facts, hypotheses, and lines of research.

The need for trained psychologists is great. It is equally important that the general public become aware of the difference between psychologist and charlatan, between the folklore of human behavior and the scientifically validated fact. Otherwise we shall continue to be duped by those who pander to a public in need of sound counsel. So few are the adequately trained experts that for every 100 persons seeking advice, 10 will find a trained psychologist, 90 will consult a charlatan. Well-intentioned or conscious fakers, the charlatans mulct the public of from 300 to 400 million dollars in fees annually—so great is the need, so few are the trained, and so low are the powers of discrimination of the general public.

PSYCHOLOGY AS SCIENCE: CORRELATING FACTS

If it is true that we profit from our mistakes, and from the mistakes of others (and we do, *sometimes*) it might be profitable to look at one of the notions that passed for psychological knowledge at an earlier day. Many of these notions we like to forget, for they are "unscientific" and will not bear critical examination. For instance, consider the pseudo-science of phrenology. A hundred years ago it was commonly believed that by making a careful observation and measurement of the bumps on the skull, the phre-

nologist could predict what an individual would do in certain typical situations. Since the bumps were believed to reveal the underlying brain development (and therefore the development of mental capacities, so they believed) many sought the phrenologist's advice when they were confronted with an important choice, such as that of a vocation. Parents took children to the phrenologist to have their heads "read," even as today they seek the vocational counselor and the tester, in planning careers suitable to their talents. Novelists of the period took pains to describe their characters in such a way that their actions might be made to conform to the new phrenological knowledge. Balzac's *Ursule Mirouet* (1842) contains many passages showing that the author is convinced of the truth of the phrenologists' claims.

Why were these claims so readily accepted? The general public could be forgiven, in part, because the claims seemed to come endorsed by "the findings of eminent scientists." It is true that such official bodies as the Institut de France remained cool to the phrenologists' claims. Medical and scientific circles were divided. There was a sufficient body of support, however, among the leaders of thought to give the claims an impressive endorsement. And Gall and Spurzheim, who presented their memorial to the Institut in 1809, were able to adduce certain *facts*. Gall had observed three pickpockets in the criminal court, noted their peculiar skull formation, and it was their appearance that influenced him in his choice of the "bump of acquisitiveness." He recalled one of his classmates of his earlier school years, a youngster extremely precocious in language studies; and his protruding eyes gave Gall a clue as to the probable location of the bump of linguistic ability. But these observers did not feel impelled to make any systematic study of all of the skulls of those arrested for theft, nor did they systematically sample and measure subjects in all of the grades of linguistic ability. Spurzheim published studies of many men of known genius, linking their special talents with the conformation of their skulls, sometimes assessing their head-shapes from portraits rather than from direct measurement, but his work was never systematic. On the basis of their spotty studies phrenology managed to achieve an easy success, for a time. A credulous public accepted and applied their findings. There was, indeed, little in the way of a scientific psychology to meet the problem; nor was there a clear conception of how to go about finding better answers.

The phrenologists' assertions were accepted, in the second place, because they were in line with certain commonly held assumptions. From the time of Hippocrates (460-377 B.C.) it had been customary to think of the human spirit as housed in the cranium. True, Hippocrates had thought of this as the most likely spot for the soul because he had found the hollow ventricles

of the brain; and he had thought these cavities an appropriate place in which to locate what he was certain must be a vaporous, breath-like substance. At the beginning of the nineteenth century new reasons for concentrating upon the skull-box appeared, for it housed *nervous* tissues. It was at this period that the discoveries of the existence of sensory and motor nerves showed the close link between nervous action and movement. Was it not reasonable to assume, then, that the brain as the main mass of nervous tissue somehow contained the answer to the riddle of the human personality? Here was a specialized tissue, receiving messages from the outside world, transmitting impulses to the musculature. Surely the ego, the soul, the mind, the executive apparatus of the personality, must reside somewhere within this critical junction-point. Was one man a linguist, another a thief, a third a great imaginative poet? Then this central network of nervous tissue must be somehow different. Arguing that the development of the brain and the development of the trait must be somehow correlated, Gall and Spurzheim sought to relate the *size* of the parts to the degree of development of specific traits, using the outside contour of the skull as an index of brain development.

And so they proceeded to their correlations. That Shakespeare was a great imaginative poet no one could deny. That his head showed rather notable development in the region above the temple (at least in the portrait Spurzheim published) was also a fact. The pickpockets and the precocious linguist were facts, and their skull shapes were equally observable. As a program phrenology was worthy of the attention of scientists. But the program was not carried out by Gall and Spurzheim, the cases were too few in number and too selected to demonstrate a point. Where others have pursued the course the phrenologists merely indicated, and where painstaking measurements have been made upon large numbers of subjects, and where all the data from *all* of the subjects are included in the final summary, there has appeared to be no relation between skull conformation and personality traits. And yet, so slowly does error die, phrenological journals continued to be published a hundred years later, in America.

There are many interesting facets to the case of phrenology; but one, at least, is worthy of emphasis. In a young science, like psychology, where facts are still too few and the human need is great, we are apt to be too easily impressed with a few correlations between the facts, *particularly if they fit in with our preconceptions and promise a simple solution for our problems*. Not knowing the full set of causes that account for an event, we are too prone to seize upon the most obvious features as our guide; and, generalizing all too often upon scanty data, we leap to conclusions not warranted by the facts.

EVERYDAY EXPERIENCE AND PLANNED OBSERVATION

Scientific observation is planned observation carried out according to rules and calculated to reveal data that will support or disprove the hunches of the investigator. Its procedures are intended to rule out the subjective factors of bias and prejudgment and to render the observation process "foolproof" and repeatable. The field of medicine illustrates the kind of gains that accrue from the pursuit of these methods. By following a few scientific rules men of ordinary mental stature have become better diagnosticians than the medical wizards of a bygone generation. Using a diagnostic routine and the instruments that have been calibrated in the laboratory, they predict the course of disease, prescribe medicine, and achieve a precision that other men could not attain when confined to the intuitive procedures, the manual explorations, the verbal questionings, of an earlier era, no matter how clever.

In the same way the psychologist hopes to discover and standardize methods and measures that will improve his appraisal and understanding of the person beyond the level attained by the impressionistic methods of the layman. As his knowledge accumulates, and as fruitless hypotheses (such as phrenology) are discarded, the *direction* of his observation is steadily turned toward more significant variables. Every fact he finds, every relationship established, sharpens his eye. Is it too much to hope that as he becomes disciplined in this developing tradition, he will gradually find it possible to approach even this most complex object of his interest—the behaving, willing, imagining, creating, reasoning, loving, hating creature, the human being—with the skill, detachment, and assurance of one equipped with foolproof knowledge and validated measuring devices?

When we reflect, for a moment, upon the nature of the field which the psychologist proposes to invade, his apparent temerity is impressive, for it is a bold man who would challenge the wisdom of the prophets and seers who have written about human nature. In phrases so beautifully formed that we preserve them intact from generation to generation, our poets and philosophers have written indelible pen-portraits of man, and of his destiny. Generations of moral philosophers and deeply religious men have tried to show the way to "salvation"; or else, in pessimistic vein, to question whether man can attain such a goal. Now, in skeptical mood, the psychologist seems to be about to question everything that has been said. His very insistence upon the importance of new methods calls into question the validity of all

truths arrived at by the old ones. And the vigorous optimism with which he prosecutes his studies seems to indicate that even if he has not yet found the answer he has found the way to search for it. To the student of the humanities such an attitude seems both brash and callow, if not sacrilegious.

One circumstance that makes it possible for the psychologist to enter this pre-empted arena is the fact that there is much disagreement among these poets, philosophers, essayists. Beautiful and convincing as their phrases are, taken singly, they are—*en masse*—contradictory and confusing, as confusing as the advice of the seers on medical matters in those pre-scientific days when the body was supposed to be subject to invasion by alien spirits, or to suffer from excessive “humours” and black bile.

For example, if we consult a dictionary of familiar quotations for some insight into feminine psychology, we will find Nietzsche’s terse aphorism, “A married philosopher belongs to comedy”, or Schopenhauer’s uncomplimentary judgment, “. . . the fundamental fault of the female character is that it has no sense of justice” coupled with the generalization “dissimulation is innate in women.” On the other hand, for the defense, we could quote Tennyson, who found in the “good mother” the root of our “trust in all things high”; and in the sonnets of the romantic poets we could gather phrases that would seem to restore her to a pedestal.

The contradictions that emerge when we collect the observations (or the ebullience) of unplanned experience, whether of the man on the street or of the man of genius, indicate that we are not going to arrive at that kind of foolproof knowledge that the task of human engineering needs by this route. These verbal reports upon life may be valuable as raw data (when we have enough additional facts for their interpretation), and they may serve as clues to the understanding of the person who utters them. They are not coercive.

These observations suggest a generalization. Every man has a “psychology” in the sense that he has a set of anticipatory judgments about people, a kind of distillation of his everyday experience. Life has produced in him a set of expectations, and out of these learned attitudes he goes forth to reason about and to act upon his world. This is the way people are. Every jailor develops a “psychology of the criminal,” every boss develops a “psychology of the worker,” every Don Juan has his “psychology of women,” and every teacher his “psychology of the classroom.” Compounded of first-hand experience (of activities that are both frustrating and satisfying) these “psychologies” serve us in the practical business of living, even when they function almost unconsciously, even when their possessor has never made an explicit formulation of his knowledge and anticipations. But it should be

remembered, too, that these private "psychologies" serve many purposes other than the one that guides the scientist. The latter, in so far as he is a scientist, is actuated by the desire to construct a *true* picture of reality, to construct a working model of nature and of man that will yield verifiable anticipations under all circumstances and for all men. Our private "psychologies," on the contrary, may serve as expressions of some infantile trauma, some intense and disappointing recent experience, some lucky accident, some justification for conduct of which we are not too proud, or as weapons for attack and defense when our ways are challenged.

Our generalization has lead us to a second one. Experience is not enough. Face to face with reality we learn to deal with it, but we do not always learn the truth. The jailor or the police sergeant is perhaps the last one from whom we could expect to learn the truth about criminals. The rejected lover is the last one from whom to learn the truth about women. Nor can we learn from the unplanned observations of Negro and white—at some area of acute interracial tension—the truth about racial psychology. If man is to become the measurer of man it must be through some disciplined kind of experience, through the observation of some special rules of evidence. And some would add—through some change in himself, as measurer. Like Darwin, who took special pains to record each contradictory fact—especially the fact that seemed to deny his hypothesis—our methods must force us to record every instance however unwelcome, unbelievable, unpleasant, and however it may contradict our deepest convictions. Entering, as psychology does, the very arenas where human conflicts are keenest, where our *amour propre* is involved, the investigator who honestly records his facts and follows their implications may expect to meet the hearty condemnation of the contending parties. Indeed, his own psychological outlook will be challenged. One of the most difficult tasks for the beginner, in the field, is that of unlearning the everyday psychology he brings with him, and of submitting to those principles that alone yield verifiable knowledge.

THE REQUIREMENTS OF A SCIENTIFIC PSYCHOLOGY

We have presented a bird's-eye view of psychologists at work, and a case exhibit of one rather poor attempt at collecting psychological facts; we have commented upon the shortcomings of everyday psychologies founded upon unplanned observation. Let us sketch, most briefly, a few general traits

this much needed scientific psychology should possess. They are the requirements that hold for any science; but for psychology they have a peculiar force and a special implication.

Test Situations

The difference between a test situation and a chance observation lies in the fact that the former is so completely planned, so definitely described, so carefully controlled, and so reproducible that the most biased, the most skeptical, and even the most hostile observer can check the findings. The physicist must report the conditions under which he measures mass and motion, and the chemist cannot describe the properties of his compounds without explicit statement of the conditions under which the properties are found. These requirements are doubly essential where living creatures are involved. Age, sex, nationality, neighborhood, class status, physical condition, motivating interests, previous experience, genetic constitution (and every other variable that makes a difference) have to be noted or controlled in the case record and procedures.

To the degree that such full descriptions do actually accompany the data the latter have value; for the situations will be reproducible, and supporting data can be found that will coerce belief. The less complete the description, the more it will become merely suggestive, until finally the observation drops to the mere statement "I knew a man once who . . ." Since the ideal of completeness is never more than approximated when experimenting with human subjects, psychological knowledge achieves a probability and a rough predictive power. Its statements of "probably, seldom, usually" can be given a mathematical expression (93 times out of 100), but when it slips into the language of "always, never, none" it must limit its statements to some local set of conditions. For the truth of the matter is that living creatures are not as easy to isolate as the objects of some other natural sciences, and the conditions-that-make-a-difference are legion. It does not matter whether the chemist measures his concentration of ions on Tuesday or Friday; but for a psychologist the difference may be important. It does not matter whether it is the first or the third time that his solution is tested; but such a difference may prove critical for psychological data. A segment of time can be blocked out by the physicist with relative ease; but a psychologist deals with creatures who have a history and who are living into a future. Hence *all of the relevant conditions* are difficult to state, or control.

Measurements

Measurement has been relatively late to arrive in psychology; we have had to devise new units, calibrate special instruments. There have been many who have preferred a qualitative approach to psychological problems; and some have even asserted that this latter is the only legitimate approach. Yet the psychologist is committed to measurement. It is the road to precision, and it is the only way in which his findings can become truly reproducible. We must measure the conditions, and we must measure the behavior. Measurement was introduced earliest in the sensory field, and in the study of reaction times; within our own century the measurements of intelligence, motivation, interests, and of personality traits have emerged. And we have witnessed the attempt to state the laws of learning in quantitative terms. Psychology may have begun with the aphorisms of the philosophers, with qualitative statements, with the roughest of approximations. It grows toward a rigorous, scientific discipline as it introduces measurement and quantitative statements. It would appear that its ultimate goal is a quantitative, mathematically expressed set of laws similar to those of physics and chemistry.

Adequate Samples

Occasionally there will appear, in psychological literature, a study of a single case that seems so complete, so full of insight, so stimulating and suggestive of new lines of research, that we are moved to say that the single case thoroughly studied is worth thousands of cases superficially handled. Mere numbers carry little weight. Moreover, if he were to make truly intensive studies of his subjects it would not be possible for any single investigator to examine very many of them. Sigmund Freud, the founder of the psychoanalytic movement in psychology, worked for a period of forty years at his profession, and according to his biographer he spent an average of eight hours a day at his labors. If he succeeded in seeing as many new patients per year as the average practitioner of psychoanalysis (who carries his patients through a treatment lasting eighteen months) Freud must have been able to study thoroughly just a little over 200 patients. Yet this man has influenced the course of psychological investigation more profoundly than many who can number their subjects in the tens of thousands. (William McDougall wrote, "I believe that Professor Freud has done more for the advancement of psychology than any student since Aristotle")¹ Shall we conclude that the power of the sample is not determined by its size, and that the brilliant insights of the man of genius can, in some instances, more

than offset the sheer weight of numbers in the studies of less gifted men?

It will, of course, be true that as the sample grows smaller we shall have to rely more and more upon the wisdom and insight of the investigator, until at the extreme we are back with the aphorisms of the sage, and it was the subjectivity and contradictory character of these gems of wisdom that started us on the quest for a more adequate method in the first place. For all of Freud's gifts we can be thankful. Nevertheless, each one of his ideas will have to be checked by the observations of hundreds of investigators. Even if the mental stature of the latter should be much less than that of the genius to whom they owe their insights, and even if their labors involve them in what seems to us to be the dull routine of measuring, checking, computing and comparing, their foolproof instruments and techniques will be required in order to convert the qualitative hunches of Freud to materials suitable for scientific formulations. In the end it will be this army of plodders who will prove or disprove the insights of Freud, removing them thereby from the field of controversy. For Freud published no figures. He has given us no quantitative summary of his findings in the two hundred cases studied. In this one respect, at least, his labors are on a par with those of the phrenologists, Gall and Spurzheim, who also "studied" a few cases.

Live Hypotheses, and a Guiding Theory

Accurate measures and adequate samples are but half the battle. No matter how inventive we are in devising new tools, no matter how industrious we are in widening our observations until they include truly representative samples, we cannot achieve our goal unless we direct our efforts upon those things that are significant. It is important that we be clear about *what* we are measuring, and that this *what* is, indeed, related to the essence of our problem.

Sometimes it seems that the aspects of human behavior we can measure most accurately are the least valuable. We can measure reaction times and state our probabilities in mathematical terms, but the reaction time of a subject carries us but a little way into the analysis of his behavior. Yet as the measureable facts accumulate and are related to one another the larger outlines begin to form. Summarized and organized into a body of theory, they impel us to find additional answers. Crucial problems emerge.

Yet such a picture, while very neat from a logical point of view, gives a false conception of the way our science has grown up. Many of the liveliest issues in contemporary psychology have arisen from the frontier of practical affairs where pressing human problems have called for an answer long before the patient laboratory worker has found answers that are applicable. It

was the practical task of dealing with the slow learner in the public schools that led to the development of hypotheses about native intelligence and to the elaboration of tests for its measurement. It was the clinical problem of treating neuroses with an inadequate set of psychological concepts that forced Freud to develop his psychoanalytic theory. There is a pressing problem, a hunch, and finally an explicitly formulated hypothesis whose implications are then tested.

Consider, for a moment, a few of the generalizations that show the direction of Freud's thinking:

The basic personality structure is laid down before a child is five, and is shaped most of all by the child's relation to his parents.

The majority of the impulsive forces governing adult conduct are unconscious. If we are asked to explain our own acts we give *good* reasons (that is, those that are acceptable) but we cannot give the true ones even when we wish to do so. We are simply not aware of them.

Every man is only partially masculine. At an unconscious level he is also feminine, and every woman is, in corresponding fashion, partly masculine. Our instinctive makeup is bisexual.

The sexual instinct is not only an important motivating factor in human conduct, in general, but its faulty expression is at the root of neuroses and the insanities. Art, poetry, and religion, are some of its socially valued expressions.

We can sense at a glance the range of problems opened up by these suggestions. The fact that nearly every one of them can be (and has been) countered by rival hypotheses asserted with equal assurance adds to the liveliness of this relatively new science (and sometimes to the confusion of the beginner who is striving to find out what, exactly, psychologists do think about human behavior). Consider the following generalizations, which seem more plausible to many psychologists:

The concept of instinctual forces, upon which Freud relies, is misleading. Aside from our organic structure, which provides innumerable reflex possibilities, psychologists need to look to the stimulating environment, which throws these reflexes into motion, to the life history of the individual (which shapes his preferences and provides him with a role) for those forces that give form and meaning to man's behavior.

The neuroses are signs of a fundamental (inherited) weakness in the individual who is unable to withstand the pressures and conflicts of everyday

living (Or, as some would shift the emphasis, it is the conflict in motivation that produces the neuroses, and conflicts can come about between any pair of action systems The sexual element is often irrelevant)

Personality is a continually developing and changing thing. It is not established at five, or fifteen, or forty, it continues to develop and to reveal new facets at each stage.

Homosexuality is a product of abnormal endocrine secretions. The glands (and not unconscious feminine instincts) determine the makeup of the sexual deviate

Art, religion, poetry, are cultural products which must be studied by the anthropologist, by the historian and philosopher. To explain such cultural products by positing instinctual forces within the individual is to explain the whole by the part Religion conditions (or shapes) the sexual life as much as the latter determines the former (More so, many would say)

An idea is, by definition, a state of consciousness To speak of unconscious ideas is to indulge in logical contradictions Freud's concept of the unconscious cannot possibly prove fruitful Instead of looking for "unconscious ideas" the experimenter must search for somatic (bodily) causes.

It is undoubtedly a healthy sign for a science to possess many lively hypotheses touching matters of great human concern The behaviorists, Gestaltists, psychoanalysts—to name but three of the rival "schools" of psychology—are collecting and organizing data according to different plans On occasion a beginner in the field is overwhelmed by the confusion involved in reading these highly specialized vocabularies; and in his disillusionment he is prone to accuse the rival schools of being "cults " Psychology does, indeed, have its schisms; but there is a large area in which there is common agreement as to the method of resolving the differences, and a mutual concern in finding the crucial facts. The student, however, needs to bear in mind that it is under the guidance of such divisive theories that the research workers have accumulated their data, and it will be important, from time to time, not only to apply the tests scientific logic has already proposed, but also to examine the underlying orientation of the investigator to his facts Guiding theories are sometimes prone to overlook important facts even when they do not distort them: we can be blinded by our scientific preconceptions, as well as alerted.

The conditions whose fulfillment must be achieved before psychological data become valid present the psychologist with such difficult problems that perhaps the question we ought to raise is, "To what degree can psychology become a science?"

A FEW BASIC ASSUMPTIONS

Determinism

There is one general assumption that all psychologists share (behaviorists, psychoanalysts, Gestaltists alike) along with the other natural scientists. The point is scarcely one that deserves extended argument before men of the twentieth century. To argue that behavior is determined, that it springs from natural causes, that it is lawful, that it can be measured and otherwise accurately described, and that with appropriate cautions and within limits it can be predicted and controlled, does not strike the modern ear as the heretical doctrine it once seemed to be. The assumption of determinism is an affirmation of faith in the worthwhileness of the scientific quest, of faith in the orderliness of all nature (including human nature). One of the sciences operating on this same assumption, medicine, has prolonged the life span, won victories over disease, released human energies. When we have found the *necessary connections* between psychological events, perhaps we shall also have the will to achieve comparable goals for human behavior.

We can afford to be cautious at this point, for it has never been demonstrated that the possession of psychological knowledge guarantees a wise application of such knowledge—or, indeed, the will that enables one to live up to his level of insight. Yet it would seem that modern man is committed to this road to freedom. Without a knowledge of the necessary laws of behavior, man can neither choose intelligently or wisely. If it is not guaranteed that with such knowledge there will also come a devotion to the correct ends of conduct, at least we can affirm that it is possible to accept the deterministic hypothesis as compatible with the goal of working to release powers man does not now possess. The knowledge of the laws of conduct is a minimum requirement for working toward any humanly desirable end.

This, at any rate, seems to be the temper in an Age of Science, in contrast to those Ages of Faith when other sources of knowledge were more highly valued.

Mind and Body

Originally, as the name implies, psychology was the science of the mind, or soul. As we read the ancient accounts it is apparent that our ancestors conceived of this mind as a substantial thing, as *separable* from the body. They believed, for example, that when the dreamer awakened and reported that he had visited distant places and conversed with absent people, his mind (or soul) had indeed left the body and viewed these scenes. This separable entity was also conceived of as a *force*, or power, capable of controlling

and directing the individual's activities. Much of the psychology of ancient Greece consisted in speculations as to the nature of this soul-substance. Greek thinkers examined each of the four elements (for they considered that all things were reducible to four basic elements: earth, air, fire, and water) seeking to discover whether or not each was fitted to carry out the soul-functions. They were also curious to know just where, in the body, such a directing and controlling substance could reside. Hippocrates argued for the head; Aristotle held out for the heart; others made ingenious schemes involving lungs, liver, pancreas, blood. But they all agreed that without this soul-substance, without this active "pusher," the body would be lifeless.

This type of thinking proved, finally, to be of little value. Modern psychology finds no use whatever for such a separable, controlling entity, either existing apart from the body or residing in some nook or cranny of the brain. Mind, like growth, is now regarded as a functioning of the entire organism that manifests it.

It is scarcely necessary to point out that such a conception is in no sense a denial of the existence of mental activities. Some psychologists, in their eagerness to break with primitive ways of thinking, have seemed to some to take such a step. This seemed to be the position of Watson when he wrote, in the heat of an earlier debate, that he could find no evidence whatever for "mental existences" or "mental processes."² Such an extreme statement is unnecessary. Whatever the words "mind" and "mental" may have referred to at some earlier time, there will remain—whatever the language or method of observation—the problem of studying the *activities* commonly called mental. If we now look upon these mental activities as a special type of functioning of the organism in its environment, rather than as the functioning of some special mind-substance, the change in our attitudes and methods cannot possibly dismiss any significant portion of these functionings as non-existent.

When our second assumption asserts that mental activities are bodily activities it is implied that in such activities sense organs, nerves, glands, muscles, are involved. Aiming a gun, signing a check, learning to typewrite, imagining a plot to a story, thinking of yesterday's ball game, are all activities of organisms. Some of them involve overt movements which outsiders can see, photograph, count, measure, and some of them involve more obscure actions beneath the body's surface, less available for objective study. If we divide the functioning of organisms into two classes on the basis of available techniques of study and measurement, the division is simply one of practical rather than theoretical significance. The two types do not become two radically different *kinds* of action, the one a function of a mind, the other a function of a body. Nor does such a distinction dismiss any important group

of activities. The problems of conscience and consciousness remain. So, too, the problems of motivation and of moral force must be faced, of self-will and self-control. To translate these problems into the new functional framework may prove to be a difficult task; and to those whose thinking is too heavily invested in an ancient and honorable language the change in the mode of conceiving may seem tantamount to a denial of the existence of some traditional problems. But if the new language can achieve an advance in man's power to grapple with the problems, nothing has been lost.

Under our present assumptions we shall never raise the question, then, "How does the mind act upon the body?" This question has lost its meaning. It is possible, of course, to conceive of ideas (viewed as implicit bodily responses) as affecting *other bodily functions*. The chronic anticipation of imminent catastrophe, a state in which salivation, gastric secretion, peristalsis are radically altered, will have its consequences for the intake, digestion, and elimination of food, for the two groups of functions involve the same organ-systems. In fact, unless we are ready to conceive of ideas as a kind of bodily action it is extremely difficult to understand how they could possibly influence material events such as these physiological processes. We shall be spared the mental gymnastics of an earlier psychology, which wished to retain the law of conservation of energy and yet to describe the manner in which a supposedly immaterial, non-physical event could act upon the levers and tissues of the body. Like the views of some of the early Greeks, the present conception holds that ideas are substantial things; but it does *not* assume that they are the functioning of a unique kind of substance. When the experimenter records the "brain waves" (electrical disturbances in the nervous tissue of the cerebral cortex) of the thinker, and at the same time records what his subject says about his thoughts, he assumes that both observations refer to a single process. It is true that the thinker may look at the experimenter's notebook and at the tape recording of the electrical changes and insist, "That is not what it *felt* like, as I thought." Neither is an electrocardiograph like the feeling of excitement. Nor, for that matter, is the expression of the weight of a substance like that of its atomic structure. We should not confuse, however, the fact of different languages or different measures or different relationships with the inference that we are dealing with different substances, entities.

The Psychosomatic Viewpoint

Much has been written, of late, in similar vein. The clinician, in particular, has found it valuable to look at his patient's behavior from two different angles. On the one hand there are the patient's ideas, feelings, fears, and the

history of his experiences which he can communicate to the physician. At the same time the electrocardiograph may record irregular heart action; analysis of the stomach's contents may show hyperacidity; and a delicate thermocouple applied to the skin surface of the extremities may indicate an abnormal drop in temperature, and so forth. An older psychology was inclined to look upon these two types of observation as indicating changes in two separate entities, a *psyche* (soul, or mind) and a *soma* (body). The joining of these two roots into the single word, *psychosomatic*, is a symbolic indication of the change in psychological thinking. Some of the energy that went into the endless speculation about whether the mental state causes (that is, occurs before) the bodily state, or vice versa, may now be diverted to more fruitful channels, for example: (1) how best to treat those emotional responses that are so disorganizing in their effects, (2) what conditions give rise to them, (3) what role they play in the larger context of behavior. It is to be hoped that we shall not quarrel as to whether the word should be *somatopsychic* or *psychosomatic*, now that we have agreed that there is a single process capable of being viewed from two different angles.

TWO TYPES OF OBSERVATION: INTROSPECTION VERSUS OBJECTIVE METHODS

Psychologists of the nineteenth century, committed to the traditional view of mind, found themselves gradually forced to justify their emphasis upon introspective methods of observation. Advances in physiological techniques steadily encroached upon their territory, and the interest in the evolution of mental functions that followed Darwin's studies turned attention of students of behavior toward the animal, the child, the primitive savage, areas where the technique of introspection broke down. Finally, within their own ranks and employing their own procedures, Freud and his followers revealed data that seemed to indicate a vast stream of mental life similar to that which had been studied by introspection yet flowing beneath the accessible conscious level.

The Behaviorists' Indictment of Introspection

It was at this point, just after the turn of the century, that a group of psychologists, calling themselves behaviorists, drew up an indictment of all introspective evidence. The study of human behavior, they argued, deserved the same rigorous methods observed in other sciences. The weaknesses of a purely introspective analysis had become apparent: (1) Its terms are not

precise. The terms such as warm, sour, smooth, heavy, bright, pleasant, unpleasant, fear, need greater precision, quantification. Like other sciences psychology should turn to centimeters, grams, seconds, and to instrumental recordings and measurements. (2) Moreover, the words of the observer are frequently misleading. Even as objective language-data they require further testing. The red-green color-blind subject cannot discriminate a flashy green suit from a sober gray, yet he has the speech habits of others who know that roses are red and grass is green. Even in the laboratory he displays uncanny talents in discriminating between colored papers; and if we accept his words uncritically we shall be misled. (3) Words are also used to deceive. The novice anxious to be permitted to fly may affirm that the tests he is undergoing arouse no emotion whatsoever, whereas the recording instruments indicate sweating palms, pounding heart, muscular tension, and disturbed breathing. (4) The intent to deceive may be wholly absent, yet the observer of his own mental states may fail to give us the kind of account from which we can deduce laws of behavior. He may not be aware of the cause of his actions. The idea that arises in consciousness in response to a stimulus word comes, moreover, we know not whence nor why. It is merely there. If the psychologist is intent upon the laws of these events, he cannot be content with studying the fragments of the total stream available to introspection. (5) So long as psychological facts are expressed solely in the special language of introspection, and so long as psychologists fail to use the tools of physics, chemistry, physiology, zoology, mathematics, their discipline will suffer from a kind of anemia. The growth of the science demands full utilization of the resources of other sciences (and a language and a method that permit sharing of data).

Because of these considerations and because of the immense prestige objective measurements had acquired in the other natural sciences, the behaviorists proposed to get rid of the introspective datum altogether, or at least to relegate it to a very minor role. They argued, and perhaps justly, that those who cared to extend their interest in consciousness down to the animal level might want to speculate about how it feels to be an ameba, or an angry wasp, but that as far as the science of behavior was concerned these speculations were irrelevant. When an observer had collected the observations as to the animal's reactions to heat, light, gravity, pressures, and had studied the changes in behavior induced under test conditions, and had reduced the data to the quantitative language of the physicist and mathematician—then he was ready to predict and control the behavior. As for the animal's consciousness (if, indeed, it had any consciousness) whatever that might be, it could not possibly interfere with whatever regularly recurring

reactions had been included in the laws of behavior. Finding the laws of behavior constituted the psychologist's task; prediction and control would be possible when this task had been fulfilled. The rest could be left to aesthetics, metaphysics, or to the genial art of storytelling. Consciousness seemed about as important for the study of animal behavior as the study of the pitch of the locomotive's whistle would be for mechanical engineering.

This last line of argument suggests that some of the animus behind the behaviorist's charges was the rejection of the kind of *interactionism* that was promoted by the earlier dualism. When mental (or spiritual) forces could be lugged into the field to account for all the unexplained actions, and when lazy observers could always invent some "instinctive" mainspring to produce an activity (or explain it) when the regulating conditions had not been studied, the progress of the science had been retarded. It was therefore in the interest of a more rigorous logic, and of a more active and exact sort of observation, that the behaviorists made their attack upon introspection.

Does Consciousness Make a Difference?

Most, if not all, of the behaviorists' indictment of introspective procedures may be admitted at once. It is the extension of these indictments to a complete and rigid exclusion of all introspective evidence that is questionable. While it may be true that the laws of behavior can be written for animals and infants without the use of introspective evidence (as must be the case) it does not follow that the laws for the behavior of adult human subjects can be formulated as readily or will prove to be as complete if these observations are omitted. The introspective report may supply the flash of insight that illumines an experimental problem and provides new and fruitful directions of search. Even when such reports must have the support and verification that can be furnished only by objective data, they can prove an extremely useful tool for the psychologist. Thus, when the performance of a learner or a reasoner shows an abrupt transition in form and speed, and the subject can at the same time report a radical change in his mode of conceiving the problem, this fact is of importance in the full account of the behavior.

At the appropriate point in the discussion of experimental data the analysis and evaluation of introspective data and of the uses to which they can be put will receive further attention. At this place it seems important to note merely that few psychologists now look upon introspection as the sole or the principal method the science should use. Nor do they consider it a device for observing a non-material, disembodied thing (psyche, soul, or mind). Twenty-five years ago the psychological field seemed about to divide into

two camps: one (behaviorist) studied behavior objectively, rejecting all concern with consciousness, mental existences, and avoiding the introspective method, the other (introspectionist) sought to carry on research with self-observation as the main method, believing that the psychological problem (to describe consciousness) was a unique one among the sciences, a problem requiring a unique method. These issues seem much less important at this distance. The psychologist uses whatever method will reveal significant data about human behavior, whether the observed facts have to do with images, anticipations, leucocyte counts, neural damage, or reaction times. The fitting together of these various types of events presents serious problems for the grammar of science; but we can face these problems as the concrete materials present themselves.

EMPHASIS UPON THE SOCIAL MATRIX

Throughout the following chapters the student will discover that the human being cannot be understood without close attention to the social matrix in which he is enveloped. From conception to burial he is both the focus and source of social forces; and in the give and take of interpersonal relations his own individuality is established.

In an earlier period, psychologists were prone to derive the social order from instinctive mainsprings, from innate biological forces within man; and human nature was conceived to be a hard-and-fast thing, a primary event. There is a tendency in some quarters today to reverse the process, to derive man's principal motivations (once called "instinctive") from the culture. It is the purpose of this book to steer a middle course between these trends, to present a science that is bio-social, and to reveal the two-way interplay of influences operating between the individual and his milieu. Only by the full realization of these relationships can the aims of the psychologist-as-citizen be realized. Only then can we see how to construct a social order that fits human nature and at the same time releases the latent possibilities now allowed to waste.

REFERENCES

1. William McDougall, *Outline of Abnormal Psychology* (Charles Scribners Sons, 1926), p. viii.
2. J. B. Watson, *Psychology from the Standpoint of a Behaviorist* (J. B. Lippincott Company, 1924), p. 2.

CHAPTER 2

Organism and Environment

So complex and so puzzling is the scene around us that it is worthwhile to pause at the threshold of our studies and to choose carefully the vocabulary that must serve us in our attempt to describe this many-sided human behavior. We see these creatures finding their way about the world they live in, reacting to pressures from without, expressing and seeking release from tensions within, circumventing barriers, attacking and destroying their enemies, seeking distant goals, creating, constructing and rearranging the world about them, and living in a world of actuality while their vision is concentrated upon a dream

Is there some *essence* of behavior, some ordering principle that can be applied to all of behavior, and that, even as it is applied illuminates all this diversity, revealing interrelations and significant points at which to set up our measuring instruments? Is there some single expression that should guide us in formulating all problems, whether they deal with the behavior of amoeba or of man? Or is there a protozoan formula, a human formula, and so on? Or should we, in studying man, remember his long evolutionary past and expect him to both recapitulate all the “laws” of his past and add new and “higher” laws of synthesis? Or is there a special formula for the creative genius, the passive dolt?

THREE LANGUAGES

The first language offered by students of behavior is an elaboration of the simple formula $Br = f(S)$, which we read: "Behavior is a function of the stimulating conditions." The stimuli that bombard the surface of the organism—and particularly those specialized portions (the sense organs) whose structures and substances are easily altered by these external changes—initiate a series of events in the organism, altering the course of its movements. In the higher organisms the changes in the sense-organs become electro-chemical waves in neural conductors which relay the effects to remote muscles, producing the contractions and relaxations that move the body-levers. Delicate, intricate, complex though the structures are, every event in the chain reaching from the physical stimulus to the movement occurs in complete accordance with the physical and chemical laws revealed in the laboratory (in studies of non-living substances). If we look upon man as a complex physical object moving through a field of physical energies, our problem may seem infinitely complex, but its nature is clear. We seek to describe the trajectories of motion, the inertias, the speeds, the thresholds of sensitivity, the limits of stress-tolerance, of living physical systems in the language of centimeters, grams, seconds.

A second language reminds us that the organism itself is a cause, that it strikes back upon the outer environment, chooses, selects, seeks, in the light of its own ends. The first view was too inclined, it is argued, to look upon structures as passive, and to lose sight of qualities belonging to the organism as a whole. This second view is commonly concerned with the struggle for survival, the adaptation of the organism to its milieu, the satisfaction of needs. Mindful of this struggle for survival and of the long evolutionary past, it sees the adjustment of the organism as no passive action of an inert mechanism. Mechanisms there may be, but through the organization of these mechanisms they are made to serve ends.

There are many versions of this second view. There are those who would like to order behavior around a few basic purposes, or ends: self-preservation, reproduction, mastery, play, and so on. This mode of conceiving behavior invites the observer to classify and group the acts he sees. Occasionally a *force* is posited—or perhaps a number of forces—a force acting in and through the responses that go to make up each category. But like the phrenologist's centers, which served to locate and explain the traits originally found in the behavior, these forces have proved to be inferential in

character. Sometimes they are conceived to be a kind of biological head of steam, a vital force; and sometimes they are viewed as mechanisms. In so far as they become anatomical arrangements mechanically operating in response to specific stimuli, the instincts offer us merely a complex version of our first type of language. If the purposive and adaptive quality of these acts becomes a mere accident, or resultant, of the long evolutionary struggle, we can understand—in the main—how its adaptive quality has come about. After all, only those organisms whose mechanisms permit survival and reproduction will continue to be found in an environment. The rest will be eliminated in the struggle for survival.

Others in this second group see behavior driven by needs *and* stimuli. The former are tensional states arising within the tissues and stimulating the organism to move. Acting jointly with the external instigators they keep organisms on the move until the tensing conditions are removed, until equilibrium is restored among the cells. Life, under the need view, becomes a series of flights and perchings, from tension to rest, from disequilibrium to balanced steady-states, with the organism viewed as moving inevitably toward the states of rest, following courses of least effort. Thirst, hunger, sex, fatigue, distended vessels requiring evacuation, empty vesicles needing to be filled, stimuli prodding from without, need-states prompting from within, the organism is seen as resolving these forces by acting so as to lower the sum of tensions, moving toward “goal states” and away from instigating conditions. Survival and adaptation are interesting sub-problems, but they are not—in this view—primary. Indeed, on some occasions, the steady-state sought by the organism (for example, a morphine addict) may be very unhealthy. The problem is to describe the conditions that regulate the cycles of behavior—whether the actions culminate in death or survival. And in view of the wide diversity of ends for which human beings seem to strive, the natural history of needs becomes an important problem.

The third approach is somewhat more flattering to man and a bit less flattering to his would-be measurers. In contrast to those who look upon behavior as a series of forced movements, a bundle of reflexes and conditioned reflexes, or as a set of homeostatic, tension-reducing mechanisms, this third view insists that the whole person is something more and other than a set of mechanically interlocking parts. Between the stimulus and the response there is a self—perhaps not a transcendental self, perhaps not some purely spiritual essence, but a self, at any rate, that is more and other than a recapitulation of a history of recurring S-R patterns, more than a shape impressed upon a plastic organism by a culture.

This third view of behavior assumes many forms, and these forms are so

diverse that it is difficult to unite them on any platform save the one that holds all the critics of the first two views

Behavior is *not* mechanical (these critics say) but purposive! McDougall and Tolman, to name but two, have affirmed this. Yet, paradoxically, the former sought to lay bare the structure of instinctive actions, which in his view underlie all habit formation; the latter, to develop the laws of learning. If the sequences of development and learning are lawful, then the purposes that emerge would seem to be predictable. Purposive though it be, such behavior sets problems for our first and second views but does not challenge their basic assumptions.

Behavior is self-actualizing, self-transcending, another version of this third view insists. Our experiences are cumulatively compounded into newly emerging wholes: we are not the eternally recurring patterns which have permitted a certain kind of science to flourish. As selves we emerge out of pasts but are in no sense repetitions of pasts. We react to challenges coming from without, but our reactions are not simple functions of the challenges. Behavior, this view would assert, is at basis free, spontaneous, creative. Whether there are laws for such behavior might remain an open question; but if this be the essence of behavior then psychology must finally record the fact, however disruptive it may be of all mechanical conceptions.

Some of the winds of criticism supporting this third mode of analysis come from those interested in moral and religious problems, some come from the field of psychiatry, some from the study of behavior itself. The followers of Gandhi would posit a primary moral force, a capacity for self-regulation, for setting ends and for disciplined struggle to achieve those ends. Erich Fromm would find the essence of the psychiatric problem to lie in the analysis of all those factors that thwart the ego in its essential task of self-realization; and Kurt Goldstein, challenging the theories of instincts, drives, and stimulus-response mechanisms, sees but one motivating force running through all human conduct: " . . . the only drive or basic tendency of the organism is to actualize itself according to its potentialities in the highest possible degree."¹

In a sense the issue can be stated thus: Can a scientific psychology be constructed that will prove adequate for the analysis of even the highest forms of human behavior? Does the inclusion of the self-transcending, self-reflecting, self-actualizing aspect of human conduct call for a new scientific framework, or can we reduce such problems to such mechanisms as we have suggested, to the type of laws that are so similar to those that exist in the fields of chemistry and physics? Or, more modestly, how far can the familiar type of scientific analysis be pushed? Or must we return, finally,

to the poets and philosophers, content to observe the spectacle of man, to sympathize with him in his difficulties, to laugh at his vanities and stupidities, accepting with natural piety that which must remain to the last, *essentially*, a profound mystery?

THE FORCED MOVEMENT CONCEPTION OF BEHAVIOR

Tropisms

For the sake of its simplicity and clarity we may start our description of behavior with the tropism, a conception ably set forth in Jacques Loeb's *Forced Movements, Tropisms, and Animal Conduct*. A tropism may be defined as an adjustment or orientation forced upon the organism by the physical stimuli that strike its sensitive surfaces. Thus the turning of a plant toward a light source would be a phototropism (or heliotropism), the circling of the fish toward the chemical diffusing from bait which he senses (but does not see) would be a chemotropism. Loeb described geotropisms (orientations to gravity), stereotropisms (orientations to contact pressures), and rheotropisms (orientations to movement in the visual field). These forced movements are quantifiable, predictable, lawful.

Tropisms in plants If we express the amount of bending induced in a tray of oat-seedlings by the letter E , the intensity of light (measured in candlepower) by the letter i , the duration (in seconds) by t , then the formula for the action of light on the seedlings is $E = Kit$, where K represents a constant that is characteristic for the particular plant studied. Experimental tests have shown that for a wide range of intensities the product it remains constant, short exposures requiring high intensities and longer exposures low intensities to produce the same amount of bending.

The relationship expressed by the formula is known as the Bunsen-Roscoe law. It applies with equal validity to the blackening of photographic paper by light, to the bending of plants toward a light source. Loeb and others have shown that the phototropic responses of some of the lower animals are open to similar mathematical treatment.

Circus movements The slug, *Limax maximus* (a greenhouse pest, a mollusc with a vestigial horny plate in the dorsal flesh) is sensitive to light. If one eye receives more illumination than the other the slug will turn toward

the side that receives *less* light. Such an orientation, carrying the animal away from the light, is called a *negative phototropism*. Thus, as the animal creeps over a surface an observer could control the path it takes by merely directing a beam of light on one side or the other. If one eye is removed and the organism is placed on a surface that is lighted diffusely from overhead, the animal will make repeated *circus movements*. The rate of turning will vary with the intensity of the overhead illumination.

Similar circus movements have been observed in the young rat whose eyes are not yet open (Figure 1), in the robber fly, and in the honey bee. In each case the movements are initiated by creating an imbalance in the illumination reaching the two optic tracts, and in each case the rate of turning is increased as the *difference* in the illumination of the two eyes is increased.

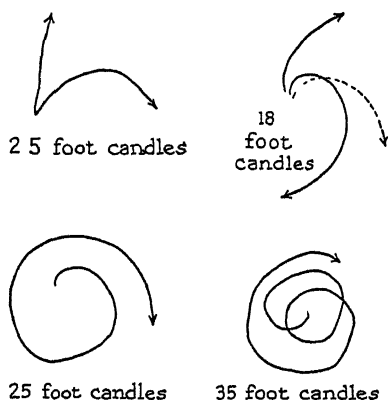
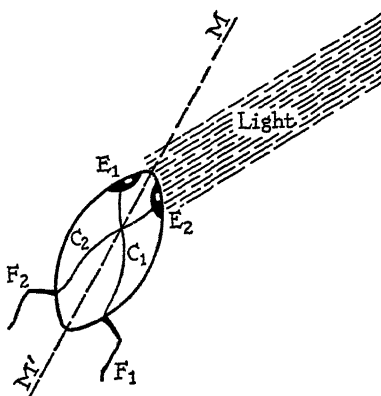


FIGURE 1. Circus movements in young rats with one eye removed (lids of the other not yet open). At low illumination (2.5 foot candles) the turning is gradual. As intensity increases, turns become sharper [From W. J. Crozier and G. Pincus, "Phototropism in Young Rats," *Journal of General Psychology*, 10 (1926-27), p. 414]

A schematic animal Without a precise knowledge of the series of intra-organic events mediating these responses, Loeb advanced a theory of tropism that schematized the essential relationships in a bilaterally symmetrical organism (see Figure 2). The cross-sectional diagram shows a bilaterally symmetrical structure with two receptors (the eye-spots, E_1 and E_2), two connectors (C_1 and C_2), and two effectors (the "flippers," F_1 and F_2 , with their muscles). When light falls on the photosensitive eye-spots it induces chemical changes, which in turn set up impulses in the connectors. The neural changes are relayed over C_1 and C_2 until they reach and activate the movable appendages. The plane MM' which divides the structure into two symmetrical halves divides a field of physico-chemical activity. When the two eyes are receiving equal illumination the chemical changes occurring in the two halves are equal, and the two moving members carry the animal straight forward. Any deflection of the path, so that the light source strikes one eye more directly, will intensify the action in one response-system. (In

this case the chain of effects is E_2 , C_2 , F_2 in Figure 2, in which the light is shown striking E_2 more directly.) When the "flipper" (F_2) moves with greater strength and speed, the organism is forced to turn back toward the plane of symmetry. The condition of balance, or equilibrium, is thus a state toward which the organism is continuously forced.

FIGURE 2. Schematic cross-section of positively phototropic animal. Light falling on receptors (E) initiates changes in nerve fibers (C) and effectors (F). If more light strikes E_2 , movements in F_2 will be correspondingly great, and the animal's line of motion will change until MM' takes the direction of the light



Non-adaptive character of some tropisms Sometimes these tropic responses are distinctly disadvantageous for the organism possessing them. The phototropism that lures the night-flying insect into the flame, and to its own destruction, is a case in point. Where toads and lizards gather under the open flame of an outdoor lamp to await the shower of injured moths and flies, it would appear that the tropisms of the insects result in an arrangement more beneficial to their hereditary enemies than to the possessors of these mechanisms. These facts should serve to warn us against using the "adaptiveness" of a response as the explanation of the behavior. The biological value of an act may rationalize (that is, justify) its existence but does not constitute a scientific explanation.

The Physics of Behavior

The instances we have selected demonstrate that—on occasion, at least—animal conduct can be subjected to the kind of rigorous analysis we are accustomed to find in physics. The structure of the organism is viewed as a system of receptors, conductors, levers, all united in symmetrical patterns and surrounded by a field of energy changes. Where these energies (for example, light) impinge upon certain specialized portions of the organism (for example, eye-spots) they induce a redistribution of the energies within the organism, involving, finally, effector contractions which move the organism through space.

We have also seen that the resulting behavior is predictable, both in direction and extent; at no point, as one change follows another, is there any evidence that physical laws are transcended or interrupted; nor is there any need to resort to biological or psychological concepts such as "will to live," "struggle to survive," "light-seeking," "curiosity," or "purpose." Loeb's experiments invite us, on the contrary, to adopt a rigorously matter-of-fact analysis of animal conduct. If we generalize from the illustrations we have noted, psychological laws would take the form given on page 26. $Br = f(S)$, or "Behavior is a function of the stimulating situation."

Thus conceived, the psychological task would demand: (1) a careful description of the responding structures (receptors, nervous system, effectors), (2) the measurement of the stimulating energies, (3) objective recording and measurement of responses in test situations, and (4) the development of constants and formulas to express the calculated relationship between the stimulating conditions and the measured responses. The physics of behavior, which would result, would also entail excursions into the fields of chemistry, physiology, and anatomy, as we attempted to build up an adequate account of the event lying between the stimulus and the response.

Apart from variations in their structure, in the chemical composition of their effectors, in the types of connections, and in the final lever-systems that execute movements—variations that make one animal positively phototropic, another negatively phototropic, one a flyer, another a climber—organisms are constantly changing in their internal chemistry. Ingested food, for example, alters phototropic responses. Loeb brought the caterpillars of the goldtail moth into the laboratory and observed their responses to light. These creatures, warmed by the sun of spring in their normal habitat in the stems of shrubs on which they feed, emerge near the ground and promptly turn upward toward the light until they meet the tender shoots and buds just forming. Chemical stimuli given off by the buds release eating movements. If, prior to their upward march and feeding, the caterpillars are brought into the laboratory, placed in a test-tube with one end of the latter turned toward a lighted window, they will crawl toward the light. Leaves of the plant on which they normally feed, placed at the opposite end, are neglected, for the positively phototropic caterpillars are held on their course by the light source. They are literally held, "slaves to the light," as Loeb observed, straining until they die of starvation. In their normal habitat, the phototropic response carries them to the buds, and once they have eaten they promptly lose their response to light. The orderliness and apparent purpose of the creature in its normal habitat represent an outcome of the action of a series of internal and external forcing factors operating upon the receptor-conduc-

tor-effector structures. In the present instance the quality of adaptiveness depends upon an *interrelation* between the organism and the environment. No regulative principle or force residing at some one point within the organism accounts for the outcome; nor is there evidence of the existence of such a force in the organism's behavior. Trapped in the unusual constellation of forcing conditions provided by the laboratory the organism is caught, unable to break the sequence of forced reactions, unable to vary its reactions until there is some adaptive outcome, unable to substitute other movements for those so closely bound to the forcing conditions. We seem to be looking at a machine, adaptive and self-maintaining under the usual circumstances, but quite unable to institute self-repair or readjustment when the mechanism runs aground.

We catch a glimpse, moreover, of a constant interplay between organism and milieu. Light sets the caterpillar in motion, its movements carry it into a new field where chemical stimuli release the eating movements, and the ingestion of food alters its internal chemistry so that its tropic behavior ceases. Eating, for this creature, produces as dramatic a change in behavior as adolescence does in the vertebrate. It is as though an internal switch had been thrown—the circuits from photo-receptors to muscles are broken, and the energies that light still generates in the eyes are now diverted to new channels. The cycle of action is held together because the dialectical interplay between internal and external forces brings it about, not because there is some mysterious internal organizer which predetermines the plan of action. Indeed, when the chain of events is broken, or when the organism is placed in a setting where the timing and spacing of the “forcers” are altered, the over-all quality, the plan, the outcome (death) are quite different. Death or survival, adaptation and maladaptation, are outcomes, end-results, not controlling principles (for example, death instinct, life instinct) nor ends which, provisioned, shape the antecedent choices.

The views of Loeb, here so briefly sketched, have undergone many revisions. Consider the phototropic response, for example. In the place of the differences in rate of movement on the two sides of the schematic animal, observers have found differences in the form of the movement, in the pattern of contraction and relaxation of the effector units. In the place of gross amounts of light reaching the eye-spot, the precise portion of the eye-spot stimulated becomes important. The light-sensitive receptor in each facet of the compound eye of the fly or bee has its own reflex connections with each and every leg, stimulation of the anterior facets producing forward locomotion, stimulation of the lateral and posterior facets producing a characteristic placement of the legs and a turning to the light source. For each light

position there are characteristic orientation reflexes. Thus tropism *theory* has been replaced by a more precise description of reflexes; and these latter, varying from the over-all postural changes to the secretory actions in a single gland, from the diffuse startle reaction to the neonate's claspings fingers (in response to the touch on the palm), have tended to replace the speculative description of a bilateral symmetry, differential rates.

Although the schema has changed, and the theory altered, the essential characteristics remain: the movements are forced, and their form is the outcome of the forcing conditions acting upon receptors, conductors, effectors and body-levers. Indeed, the range of problems now brought under this essentially forced movement conception has increased enormously. Mere locomotion and movement to and from a stimulus source are now joined by vocalization, preening, pecking, excreting, swallowing, vomiting, stinging, copulating, barking . . . by the whole range of reflex actions. So anxious was the physiologist Pavlov to include what he felt to be one of the highest and most significant traits in human behavior (the capacity to strive consistently for the achievement of an end) that he chose to speak (at the Third Convention of Experimental Pedagogy in Petrograd in 1916) on the reflex of purpose. All of behavior, it seemed, was about to become reflex in character; and if man retained a belief in the regulative self, the power of will, the determining idea, these conceptions remained the one puzzle, the illusion, the exception to be accounted for. Theory was pointing to a physics of behavior, an anatomy of behavior, a forced movement conception of behavior.

Loeb noted as he concluded his studies:

"The persistent courtship of a human male for a definite individual female may appear as an example of persistent will, yet it is a complicated tropism in which sex hormones and definite memory images are the determining factors."

Along with Pavlov, Loeb was ready to add the force of all associated stimuli to the inherent force in any physical change acting on receptors. And he added:

"Our conception of the existence of 'free will' in human beings rests on the fact that our knowledge is often not sufficiently complete to account for the orienting forces, especially when we carry out a 'premeditated' act, or when we carry out an act which gives us pain or may lead to our destruction, and our incomplete knowledge is due to the sheer endless number of possible combinations and mutual inhibitions of the orienting effect of individual memory images."*

* Jacques Loeb, *Forced Movements, Tropisms, and Animal Conduct* (J. B. Lippincott Company, Inc., 1918), p. 172. Used by permission.

THE ORGANISM AS A DETERMINER OF CONDUCT

In Loeb's account the organism was not altogether static, passive. Internal bodily changes, gland secretions, the chemical changes resulting from ingestion of food, acids produced in the course of metabolic processes, were viewed as important factors in causing changes in the sign of the tropism (from positive to negative heliotropism, for example) or for the sudden appearance or disappearance of tropic patterns.

Compensating Mechanisms: Homeostasis

As physiologists developed this concept of a varying physiological state they became more and more impressed with a certain "thermostatic" quality in the effects of these changes upon behavior. And not only was internal temperature maintained in the face of fluctuating changes outside, the composition of the internal fluids that bathed the cells was kept within certain narrow limits. As a dynamic energy-consuming system the active organism must continually replenish its deficits, eliminate its waste products. The adaptive quality of its actions appears as soon as we note that as the deficits occur, the ensuing alterations in behavior are such as to restore the earlier condition of equilibrium. As the outside temperature falls we shiver, move about, flail our arms; and as the oxygen supply falls (as in rarefied atmosphere) we breathe more rapidly and deeply and our hearts increase their work. Viewed from this angle, an organism may be described as a set of compensating mechanisms so operating as to maintain a steady state against assaults from without and against deficits arising from within. This tendency for an organism to maintain such a steady state is called *homeostasis*. In these instances we are concerned with mechanisms, forced movements, which are adaptive.

Interference with homeostasis: experimental motivation If behavior varies with changes in organic state, the investigator who seeks to find the laws of behavior must control (or at least take into account) the states that exist at the moment he makes his observations. At times he will *produce* specific deficits. When animal learning is studied the common procedure is to withhold food from the animals for a definite period. Such animals are said to be *motivated*. They become more responsive to the stimuli in the learning situation and, in addition, *especially* responsive to the food that neutralizes their hunger. Food can be described as a reward, or as a reinforcement—in such cases—and the act leading up to the acquisition of food as a reinforced response. Such reinforced responses gain in strength as this

process is repeated, appearing earlier and earlier in the varying sequence of acts until, finally, whenever the deficit is operating in the experimental field these acts emerge at once. Thus, if an animal possesses the capacity to learn, by controlling the internal state and the placement of the incentive (food) he can be forced to take a specific route habitually—any specific route that lies within his repertory of possible acts, any route that can be controlled by particular patterns of reinforcement.

Variety of conditions motivating human conduct The motivation of human behavior presents a more complex problem because the totality of these internal tensional, deficit states is more complex. Human beings react to a wider field, accumulate aftereffects of a longer past, respond to subtler and more complex relationships within the field. They may be experiencing anger (at what they consider a snub by the experimenter), irritation at the length of time an interview is taking, disgust at the poor taste shown by their questioner, hunger (as the experimental hour keeps postponing an intended visit to the snack bar); and they may bring into the experimental room distracting thoughts of conditions at home or of other events remote from the concerns of the experimenter. Sometimes they are under tensions of which they are quite unaware. Since the totality of such internal conditions is changing from moment to moment even in an objectively constant external environment, the behavior that is forced out by controlled stimuli will have a notably variable character. The theory implies, however, that the more completely these internal factors are incorporated into our formulas, the more the physics of behavior will fit the complexity of human action.

Growth and Development

From birth until death the organism continually changes. Some of the energy-supplying chemicals taken in as food are built into cellular protoplasm as cells divide and redivide. Nerve fibers, muscles, bones, increase in size; new connections are formed in the nervous system; muscle cells increase in size and contractile power. Bones harden and become capable of sustaining weight. Glands undergo spurts of development and atrophy, thus altering the internal milieu. The student of behavior must gain some notion of the nature of these structural changes, of their pace and of the conditions that alter the rates of change, *and of the behavioral changes that accompany each stage of growth*. This involves the psychologist in a study of the process of development as a whole; and he must make longitudinal studies of the development of single organisms in order to correlate the cross-sections of behavior which he has sampled at different age levels.

The individual and the norm The study of developmental careers indicates a wide diversity of pace as well as terminal status. Over the last quarter-century psychological clinics have examined tens of thousands of infants and children. The results of a very complete program of tests and measurement give us average values for each of the chronological levels. Placed against the background of such norms the individual child can be assigned a *developmental quotient** which summarizes in a single index number his normality, precocity, or retardation. In the Yale clinic norms were worked out for each of three dimensions of growth: physical, intellectual, and social-emotional.

The general impression emerging from a first examination of such data is that, while growth rates vary from individual to individual, they are fairly consistent for a single individual. Slow-growing infants continue to be slow growers throughout the maturing period, and their original low quotients are matched by the ultimate low terminal status they achieve; whereas the precocious infant tends to be the superior adult. A further general impression of internal consistency or symmetry of growth in the three main dimensions is apparent also: the development of postures and manual skills, the development in language and perceptual discrimination, and the acquisition of the more mature social and emotional adjustments, tend to keep pace with one another. If this general impression were to be borne out by the close inspection of individual growth careers, the problem of prediction would be a simple one. The early measurements would establish a segment of a curve, and an extension of this curve would point to the goal toward which the developmental process must inevitably move. If all developmental rates proceeded in such a consistent fashion, and if the consistency of individual differences proved to be as great as those gross differences we see between the species, then our problem would be that of locating the *internal* regulators—those pacemakers within the organism that establish the rates of these biological clocks that tick out so remorselessly the periods of infancy-childhood-adolescence-maturity-senescence.

While the over-all trends seem at first to support such a stress upon *intrinsic* regulators, the more precise study of individual growth careers reveals greater variability and greater susceptibility to external influences. Early precocity is not always carried through to maturity, and the retarded infant may achieve normal status, later in life.

* A developmental quotient (DQ) is computed by dividing a child's developmental score (the figure that summarizes his actual performance on the tests) by the norm for his chronological age. Thus, if the average two-year-old makes a score of 72 in the tests, and a particular child's score is 84, his developmental quotient would be $84/72$. Expressed as a per cent, as is customary, the child's DQ is 116.

The type of questions put to the clinician and the need for caution in all predictions based upon a small segment of the developmental span, as well as the need for a consideration of a wide range of variables, are illustrated in one of the published studies from the Yale clinic.²

THE CASE OF B. C B C had undergone seven developmental tests prior to the age of one year. Born out of wedlock and abandoned by his fifteen-year-old mother, the child had spent these months in an institution. A young couple in good circumstances were eager to adopt the child and to give him every advantage, including a college education. What was the prognosis for growth? The seven tests indicated a consistently low developmental quotient (ranging between 80 and 85 per cent of normal). In the light of the general trends the child's most probable adult mental status would appear to be below that required for college entrance. The clinic's cautious but slightly pessimistic appraisal (" . . . with regard to the question of college educability, the outlook has become increasingly dubious . . .") dissuaded the prospective parents and the child was finally placed in another foster home.

Many factors complicated the prognosis. The mother was of normal intelligence, the father unknown. The child was probably born prematurely, but this was not known for certain. Born out of wedlock, experiencing the disadvantage of institutional care (relative isolation, lack of maternal affection and care), afflicted with rickets and an intestinal disorder, there was ample reason to believe that the test scores of this child did not reveal his ultimate possibilities for growth. Continued study of the child in his new foster home revealed that this was the case. At nine his intelligence was normal and at twelve his IQ was 115, an above-average quotient within the range of successful college students.

THE ORGANISM LEARNS

In organisms that learn, the traces left by a series of interchanges between the organism and environment produce cumulative effects. It is as though the hammer blows of stimuli produce more or less lasting modifications of structure so that, returning to the old stimuli, the organism reacts in a new manner. The burnt child avoids the fire; the pup that has been previously dosed with medicine departs when the door of the medicine cabinet is opened; the mishandled colt turns out to be a vicious and unpredictable saddle horse.

A CASE REPORT A young woman in her twenties reported to her physician that the sight or taste of orange juice produced nausea or vomiting. Questioned, she stated that in an attempt to correct a digestive upset she had taken castor oil mixed with orange juice. She had always been especially fond of oranges, but the mixture made her ill and she had vomited repeatedly. The next morning, and for weeks afterward, she could not taste, smell, or even watch others drink orange juice without becoming nauseated.³

Such an illustration indicates that the full contribution of the organism (in any given sample of behavior) cannot be evaluated until we know something of its history, for it bears the scars, or traces, of its earlier reactions. The illustration further suggests that these scars predispose it to react as it did formerly even when, now, a mere fragment of the former physical field is present. We understand and accept readily the fact that the blacksmith's muscles show the accumulated effects of his daily labors, and we feel that we can understand the process of toughening that hardens the flesh of the foot of the barefoot boy. And among the anthropologist's *curiosa* we have learned to accept the gross anatomical changes in feet, lips, ear lobes, and skull, produced by binding, stretching, piercing the tissues of developing bodies. Now we are asked to consider a much more subtle type of scar, a shape or pattern imprinted upon an action-system by the patterned action of external stimuli which touch our receptors only momentarily. The scars are not visible, and the precise nature of the traces is not yet understood. No microscope is powerful enough to reveal them. Yet, as in the case of Erickson's patient, the patterned imprint upon the action-system is revealed the moment orange-juice taste or even the sight of an orange is applied as stimulus.

Thus, while the organism is growing in size and strength and the nervous system is undergoing differentiation and elaboration, the environment is stamping its traces upon these growing tissues. By its barriers, rewards, punishments, and its protective shelter, it beckons, kneads, challenges, suppresses—until the growing, responding, struggling one has internalized the very form and structure of its field. One three-year-old likes his egg hard-boiled, another wants his "runny"; one eats his spinach, another detests all green foods; one is afraid of the dark, another is so venturesome that he can scarcely be curbed. The example we have chosen suggests that at least some of the patterns of likes and dislikes, of approach and avoidance, are founded upon cores of forced movements (grasping, vomiting, crying, startle-reflexes) that are common to the species. Some of the diversity in the outcomes that

we see would then be the product of the unique individual histories that have patterned these reflexes into unique bundles.

Learning Equilibrates: A Special Case of Homeostasis

As we observed above, the student of the learning process sometimes goads his experimental animals into action by first depriving them of food. Then he places them in mazes, puzzle boxes, or other contrivances which contain food, but which interpose barriers preventing free access to the incentive. The precise movements of the animal are not controlled. He may bite, scramble, move levers with his paw, enter blind alleys, jump upon a platform. And until he achieves release from the experimentally created internal tension he must do something; goaded from within and invited from without he remains active, responsive. While the details of his movements are not predictable, and the order of succession varies from animal to animal and from trial to trial, the outcome can be foreseen. The experimenter can convert his subjects into button-turners, platform-jumpers, lever-depressors, simply by varying the experimental set-up. The finally established pattern will be whatever serves as a means of achieving homeostasis. Such a process is commonly called *instrumental learning*.

An important aspect of such instrumental acts is their instability. If the experimenter discontinues the relationships between deficit and incentive so that the act no longer secures the food, the animal will gradually discontinue his efforts. Conditioned responses of the type presented in Erickson's example also tend to disappear unless the sight or taste of orange is occasionally reinforced. Reaction-tendencies are thus seen to rise and wane according to what they do for the organism as a whole.

Thus, depending upon the kinds of motivating conditions and the incentives an environment provides, some individuals will have their capacities to respond developed to the fullest; others will remain complacent, or if motivated without opportunities for release, show patterns of frustration, confusion, irritability. Environments can depress and stultify, distort and disorganize, or transform simple reflexes into intelligent perceptions and skilled anticipations of the future.

Learning Raises the Problem of the "Pseudo-Environment"

In spite of an experimenter's care in arranging his test situations, in spite of his control over lights, sounds, pressures, and gravitational pulls (or the directions given to his human subjects) he is always confronted with the possibility that the problem he intended to present to the subject is not the

problem as the subject sees it. Kurt Koffka developed this notion by quoting an old German legend.

"On a winter evening amidst a driving snowstorm a man on horseback arrived at an inn, happy to have reached a shelter after hours of riding over the wind-swept plain on which the blanket of snow had covered all paths and landmarks. The landlord who came to the door viewed the stranger with surprise and asked him whence he came. The man pointed in the direction straight away from the inn, whereupon the landlord, in a tone of awe and wonder, said: 'Do you know that you have ridden across the Lake of Constance?' At which the rider dropped stone dead at his feet."*

The behavior of the rider, in this illustration, was adjusted *as though* to a barren plain. The absence of tension, the posture of the horseman, the whole internal pattern of expectancies and anticipations fitted another environment than the objective, geographic, world outside. In a sense the rider *projected* his own "map" of reality and proceeded to react to this conception of things rather than to the objective world itself. Such a projected environment, within which the person believes his acts occur, should be called the "*behavioral environment*," Koffka believes; for his behavior is adjusted to this projected world. The formula has become $Br=f(PsE)$, if we use PsE as the symbol for this "pseudo-environment."

Two languages and two interests Koffka's illustration serves to remind us again of two lines of interest along which psychological research has developed. The Gestaltists, typified by Koffka, have sought adequate ways of discovering and describing the "behavior environment" and of laying bare the factors controlling the way in which it is structured, organized into configurations with meaning. The objective psychologists have sought to develop theories similar to that of Loeb, in which behavior is studied as a function of stimulating conditions (the geographic world described in terms of centimeters, grams, seconds). Inevitably these two approaches must be made to meet. The physiological states and the history of past conditionings, the structures of the sense-organs and the responding mechanisms, affect the modes of grasping (and conceiving), and once these "in-between" processes are set up within the organism they alter the effect of objective stimuli. *To bring about a unification of these approaches requires the psychologist to "objectify" the pseudo-environment, on the one hand, and at the same time to carry the objective analyses of the physiologist and the student of animal behavior to new levels of complexity.*

* Kurt Koffka, *Principles of Gestalt Psychology* (Harcourt, Brace & Company, Inc., 1935), pp. 27-28. Used by permission.

ORGANISM, PERSON, AND SOCIETY

Organisms become persons as they participate in human society. Without the environment of persons the child could not even maintain himself at birth. He is equipped with reflexes and reactive at the start, and the tensions in his homeostatic mechanisms arise promptly and automatically. In contrast to the precise and elaborate reflexes of insects (which include nest-building, web-spinning, comb-building) with their relatively limited need of experience and their equally limited plasticity, the human infant's responses seem random, diffuse, un-patterned, and his road to equilibrium is longer and more variable. Helpless as he is, his cry may prompt an adult to action, but the skill and continuing concern of the adult are what keep him alive.

The matrix of persons surrounding the child is not a mere audience of passive or indifferent observers. The family focuses upon the new member, expecting, hoping, fearing, punishing, rewarding. In their turn, the members of the family are linked to a wider culture from which they receive punishments and rewards. Some of the latter they pass on to the child, for in their love and concern they hope to shape him into an individual who corresponds to a shared ideal, into the one whom the tribe will accept as good *Zuñi*, good Republican, good sport. Into this going system of adult relationships the inexperienced and inexpert organism has to fit. His survival and comfort depend upon it. He cannot escape the tensions arising from his needs for food, sleep, elimination; nor can he avoid fears that arise within him as he meets environmental pressures with his poorly organized reaction systems. His instrumental learning involves him, therefore, in a complex network of interpersonal pressures.

In this view society becomes a huge maze controlling and channelling our struggle to gain access to need-satisfying objects and goals, inciting us here, creating deficits there, and reinforcing and rewarding our efforts. At times the growing individual's discovery of a role, his achievement of an adjustment to a social group, and his acquisition of an orderly method of scheduling needs, are all outcomes of a long process of instrumental learning.

In coming to terms with the vitally important world of persons the child acquires a personality. He takes on the common patterns of action and belief, even as he organizes these into a unique life style. Cast for certain roles, offered certain possible schedules, he may find them all so frustrating to his own unique pattern of needs that he rebels against what outsiders see as opportunities, yearning for goals nearer his heart's desire. And his coming to terms with his culture is not made easy; for, as he soon discovers, the

culture is not *one*. He learns in Sunday School of a way of life and of a view of a moral order that do not fit in with the sharp practices to which he is required to adjust in the market-place—if he is to hold his own—and from the children in the alley he learns things that contradict what his own trusted mother had taught him. As he internalizes the contradictory “lessons,” the inconsistencies in the culture become inner conflicts; and a process of continuous readjustment and moral struggle becomes his lot.

Psychology has to look at the individual both as an organism and as a member of a social group. As an organism he is born with certain structures and capacities. As these structures are thrown into their characteristic patterns of functioning by the impact of the environment, adjustment-problems are forced upon the organism, needs or deficits rise and fall, and homeostatic mechanisms set in motion compensatory strivings which tend—in the main—to restore equilibrium. In this process skills and expectancies, habits of acting and perceiving, are established, fixated, or laid aside. Forced to come to terms with a going social matrix, the dynamic trends in his behavior are the joint product of his own bio-physical nature and of environmental pressures, particularly pressures from the world of persons surrounding him.

To comprehend the acts of such a being requires a synthesis of many facts. To understand what he thinks, feels, intends *at this moment* may require a knowledge of his childhood, of the aspirations of his parents, of the behavior of his neighbors, and of the forces at work in a broader culture. And we may need to assess his physical status, his position on a maturity scale, his genetic endowment from his ancestry. When we have studied the processes of growth, learning, of perceiving and reasoning, and the ways in which our bodily structures are involved in these processes, the practical use of our laws of behavior will require some way of organizing the particular facts into an individual life history. Facts as diverse as blood pressure, bank account, IQ, skin color, bed-wetting in childhood, club membership, and philosophy of life have to be fitted together so as to make sense. A case history, such as the following, may serve to illustrate the problem.

THE CASE OF MR. X. Mr. X is an upper-class Negro, 40 years of age, living in a midwestern community and conducting a practice of medicine. He is married, has one child, and is in comfortable but not affluent circumstances. His record as a medical student indicates a high order of ability, and in spite of the handicap of color he has won considerable recognition within his profession. He writes articles in professional journals, his broad social interests and participation in the civic and professional fields mark him as an alert, responsible physician and citizen.

As a Negro he is not received in the white homes that would otherwise be open to him on the basis of his own abilities, appearance, manners. His views are therefore shaped by face-to-face contacts with Negroes, and although his professional interests are keen he is repeatedly forced to step forward as a "race man," representing his people. Born in the family of a Negro preacher in the South, a man of considerable attainment and refinement, X has the tastes and aspirations and beliefs of a middle-class white man. He, too, shares the ideals for which this country was founded, but his skin color exposes him to frequent rebuffs and privations which have made him doubt the sincerity of the white man's professions of democracy. His home is in an undesirable section of the city, his children will inevitably be exposed to conditions not of his choice, his professional career is frequently hampered.

His role in the northern city where he now practises is not as clearly defined as it had been in the Deep South. Though the barriers of caste still operate there are many situations in which the permissible is not clearly defined. Some restaurants, for example, will serve Mr. X; some of his colleagues appear to overlook his color in their professional contacts. He does not have to ride in a special section of public conveyances or sit in a special gallery in the theatre. Yet in many areas the lack of definition in what he is to expect exposes him to embarrassment and conflict; and urged by his own pride and sense of responsibility to his race (so he formulates it) he is led to explore this dangerous area and to attempt to extend it, if possible.

His personal bearing is for the most part extremely dignified and restrained, although sometimes he gives the impression of having strong feelings very near the surface. Under provocation he asserts his "rights", he is both proud and sensitive. In an interview with his physician he says that he experiences a great deal of tension and frustration. Sometimes his irritability makes him difficult to live with in the family. He is extremely ambitious, with a keen sensitivity to injustice and a tendency to ally himself with all underdogs. His clients are from his own caste group, collections are often poor. To his financial worries he adds a concern about the future of his son faced with what he believes to be a deteriorating racial situation.

To a specialist whom he has been forced to consult about his own health he complains of gastric distress before and after mealtime, loss of appetite, occasional acute pains in the abdominal area. On palpation of the abdomen, during an examination, the specialist locates a local area of tenderness. Continuous observation of the stomach and analysis of its con-

tents reveal a chronic hyperacidity and hypermotility. Moreover, during an interview which paralleled the continuous gastric study, the chemical analysis of successive 5-minute samples of gastric contents showed that during discussion of his sources of tension acidity and motility *suddenly increased* (Comparable data from another patient are shown in graphic form in Figure 3.) And on the occasion of an outburst of resentment some blood appeared in the sample of the stomach's contents X-ray diagnosis established the presence of a stomach ulcer.

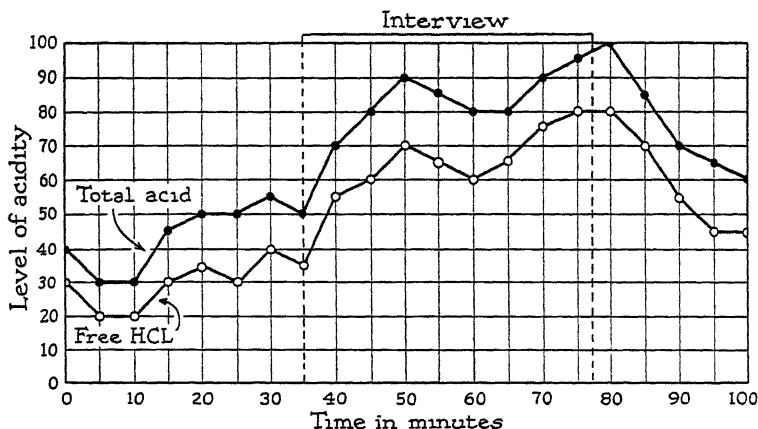


FIGURE 3 Increase in acidity of stomach contents during an interview which aroused anxiety and resentment in a patient. [From B. Mittelman and H. G. Wolff, "Emotions and Gastroduodenal Function," *Psychosomatic Medicine*, 4 (1942), p. 26.]

Ordering the Data

In order to relate the facts we have just considered, and to group them in some systematic way, we might classify them in four descriptive levels. At the first level we might consider the social aspects of the case both the caste-structure of the larger society and the more immediate interpersonal relationships which have affected X. From his family, and from his schoolmates, and from a southern white society, he learned very early the meaning of skin color and the appropriate ways of behaving if he was to avoid most painful consequences

At this first level we would place a description of the family structure, the personalities of the father and mother, the methods of discipline, the kinds of affection shown the child. It was here that he acquired his system of personal ideals, his levels of aspiration. In another Negro home, if we were to turn to a lower-class family, a child would not have been taught to

look forward to an education or to a professional career, but X's father had won both of these, and it was easy for the boy to see that these things were possible. Possible, that is, if one were frugal, if one worked hard, if one postponed the good time in the present for the more remote goal, if one associated with the right companions, if one worked hard to get good marks in school, and if one were careful to restrain the expression of one's emotions and never to transgress the lines laid down for decorous lower caste behavior. All these *ifs* meant the imposition of restraints (restraint upon impulses, and restraint upon the expressions of frustration arising from restraint) and the establishment of work habits that often ran counter to impulse—an excellent soil in which to cultivate a rigidity of character, an unrelenting self-control. The colored father knew, and managed to convey to his son, the fact that the cards were so stacked against the Negro that if he were to succeed in becoming a professional man he would have to forego many things on the way. On the other hand, his family were able to reward the boy both materially and through the expression of their affections. They gave him the tuition for his training, books, tickets to lectures and concerts, and expressed pleasure in his successes. X, on his part, continued to aim high and to strive persistently.

At a second level we can attempt to put down those facts discovered when we attempt to look within X, himself. Since we have no way of observing his consciousness directly, we shall have to watch his behavior and, particularly, what he says. If we have established a good relationship with X he will tell us, as he does his physician, about many of the anxieties, fears, and aspirations of which he is conscious. Sometimes he can be caught off guard, giving his reactions to a story he has read, a picture he has seen, an event in which he participated. From these reactions we can infer something of the style and form of his own inner picture of the world, his system of values. When all of these second-level facts are pieced together we arrive at something like a "private world," and as we come to sense it fairly completely, much of his behavior becomes more intelligible.

At the third level we peer within, not to observe consciousness, but rather to see the workings of the body machinery. The tonus of his stomach muscles and the intensity of their contractions, the flow of gastric secretions and the acidity of the stomach, the reactions of the autonomic nervous system to drugs, and so on, give us an indication of the workings of the physiological machine. The lowest level on our scale of facts in this classification would include the physico-chemical, anatomical findings, the X-ray picture of the scar, the action of the acid upon the tissues, the effects of mechanical irritation (rough foods in a hypermotile intestinal tract), and such factors.

One-Level Descriptions: Over-Specialization

When all these descriptions are brought together in terms of a single case it becomes apparent that no one set of facts is basic, or causal, while the other facts are secondary and derived. No plane of discourse can be neglected. We would be foolish to act as the blind men in the fable who examined the elephant and reported in such contradictory fashions, each insisting upon the correctness of his interpretation. In the case of Mr. X one of the blind men might insist, "It's an overactive vagus nerve"; another, "It's a matter of too much hydrochloric acid in the stomach"; a third, "It's just a state of tension and anxiety, purely mental"; a fourth, "It's a case of conflict generated by the caste system." And if our disputants each wrote out a prescription for Mr. X, such differing bits of advice as the following would be produced: (1) "Take a little belladonna, it will quiet the vagus nerve"; or (2) "Take a little of Dr. Bizma's powder, it will neutralize the acid and protect the lining of the stomach"; or (3) "Take a course of psychotherapy, it will help you to understand yourself, enable you to relax all this muscular tension, relieve your anxiety"; or (4) "Come to terms with this racial question. Fight to alleviate injustice"; or (5) "Give it up. Learn to adjust your level of aspiration to the kinds of activities permitted by the existing caste structure."

Achieving a Synthesis

For the practical person "anything is a cause which makes a difference." Even the generous practitioner recommends a wide diversity of therapeutic efforts, hoping to hit upon one that will work. What are the true causal relations at work, here; and where shall we find the leverage to change things? If Mr. X has become such a difficult person that his marriage is threatened, and if taking Dr. Bizma's powder relieves the stomach condition that makes him so irritable and complaining, then the practical person will be perfectly willing to explain marital difficulty as due to hyperacidity. In history-taking it will be a matter of which came before which; whereas in therapy it will be the one that makes a permanent cure possible. In our illustration middle-class aspirations become an important (though not the sole) cause of lesions of the stomach wall; and loss of appetite can be viewed as the consequence of repeated snubs from professional colleagues. Amazing interrelations appear: the *behavior environment* becomes a critical factor in determining the secretion of gastric glands, a social structure causes lesions in the digestive wall of an ambitious member of the lower caste, and so on.

The meticulous logician is horrified at such a prospect. He sometimes

asserts that a principle of homogeneity must regulate all cause and effect descriptions; only psychological causes can produce psychological effects, and from physical causes only physical effects can flow. He would rule that it is not permissible to link the different descriptive levels in any causal statement, and would look with disapproval at the practitioner's lack of sensitivity to the logical requirements. He would urge us to develop one consistent language which would reduce all observations to one of the four dimensions, projecting all observations upon one plane of discourse.

But the choice of a plane is a difficult one. Shall it be the plane on which we have described the "behavior environment" of X? What is the centimeter-gram-second equivalent of maternal affection? These questions are easier to raise than to answer. Practically, again, the different levels turn out to be different specialists, persons with an absorbing interest in one aspect of reality, each convinced that his findings are *basic*. So we see practitioners who are chemists at heart (or anatomist-surgeons) who believe that all facts are ultimately physico-chemical or structural, or that if not so described they are of little importance. And we have our psychologists who insist that "all is purpose" and that any physiological events that may be occurring at the time are wholly irrelevant to their task. And at the opposite pole are those students of behavior who assume that an objective account of physical stimuli, together with the instrumental record of the organism's movements (both explicit and implicit) tell us all that we need to know in order to develop psychological laws.

These issues cannot be decided by any fiat or rule of logic; and the day is far distant when any one theorist can reduce the diversity of relationships, within which the human individual functions, to a single vocabulary or level of description. Men who work in clinics, citizens who would cooperate, have to find a way, through the exercise of sagacity and mutual respect, to use divergent languages and at the same time keep their thoughts centered upon one reality.

REFERENCES

1. Kurt Goldstein, *Human Nature in the Light of Psychopathology* (Harvard University Press, 1940), p. 194.
2. Arnold Gesell, Catherine S. Amatruda; Burton M. Castner, and Helen Thompson, *Biographies of Child Development* (Paul B. Hoeber, Inc., 1939), nn. 16 ff.
3. Milton H. Erickson, "Hypnotic Investigation of Psychosomatic Phenomena. A Controlled Experimental Use of Hypnotic Regression in the Therapy of an Acquired Food Intolerance," *Journal of Psychosomatic Medicine*, 5 (1943), pp. 67-68.

CHAPTER 3

The Individual and His Social Matrix

There may have been a time when the argument, "It's against human nature" could serve to damn any program of social reform; but with the accumulation of anthropological knowledge over the past century we are puzzled to know which of the dozens of varieties of human nature reveal the essence of *genus Homo*. Indeed, we even come to doubt whether the limits of variation have been established.

THE VARIETIES OF HUMAN NATURE

Collecting his facts like a curio-seeker, at the beginning, and inclined to account for the diversity in his phenomena as somehow dependent upon racial and biological differences, the student of this question has grown increasingly sensitive to the effects of the organization of tribal life, of the methods employed in the care and education of the young, of those processes whereby a culture is maintained and transmitted. As his accounts have grown more complete he has been inclined to abandon his first easy explanation and even to raise the question: "Is it possible that these different cultures actually *produce* different varieties of human nature?"

Within one of the cultures he discovers an identifiable and recurrent combination of competitive striving, ambition, violence. The members of a second tribe present, in contrast, a uniformly bland, cooperative, complacent exterior to the investigator; and they describe their ideal as "the man who is

never talked about." Another society is moralistic, stern, harsh in its discipline of children, hurrying them along the developmental path toward adulthood. Its neighbor has few taboos, lets its children grow up with the pigs and chickens which run wild at the edge of the forest. It punishes precocity and overlooks stupidity; and it is as unconcerned about the sexual lives of the youths and maidens as it is about the matings of the pigs and chickens.

Is the human organism such a plastic thing that it can be shaped into these various forms? Can we identify the institutional arrangements that determine these different goals of development? Are the deviants and the misfits who do not conform (and every society has a few) individuals who are radically different *biologically*? Or do they represent sporadic failures in the culture to use means consistent with its goals, moments when the culture-transmitters napped?

FOUR CULTURES

Four brief samples from anthropological and psychological literature are presented below, one from a sub-variety of our own culture and three from tribes that differ from our own and yet remind us, by their very contrast, of our own institutional arrangements. Because of the incomplete nature of the data the skeptical reader will scarcely be convinced that precise answers to our questions have been found; but the total picture will help us to formulate certain general hypotheses that can serve to guide us in the analysis of growth and development in our own culture.

Samoa

The geographic environment Nature is kind to the Samoans. Living in a moist tropical climate where the cocoanut palm and the breadfruit tree thrive, and where taro-roots, yams, and many varieties of fish and crabs furnish enough food for all without too much labor, these easy-going island people have needed only the simplest crafts and skills to ensure their livelihood. Their lands, held by household groups, are worked collectively by the adults and older children of the extended family under the direction of a *matai*, the head of the household.¹

The structure of village life Samoan life is an ordered life. Whether one observes a group going to the fields, a fishing expedition, a house-building, or a visit to a neighboring village, there is a hierarchy of rank in the group.

Just as the meeting of the council in an American village will require the election of a chairman who will then proceed according to rules, almost all Samoan groups tend to fall into an ordered pattern. It is a pattern that repeats itself in the more permanent councils of the island, in the village council of the *matais* with their head chief, in the household organization, in the temporary fishing party

The main structure of the village hierarchy is relatively fixed. The title of chief of the village is hereditary, descending within a definite lineage. The successor to the chief is selected upon the basis of the relative fitness of the various candidates and not upon order of birth. Precedence and authority within the household or the working group are matters of age and of skill, the skilled carpenter, at a house-raising, serving as a temporary *matai* for his working party. The group of women going on a visit to a neighboring village will appoint their own *taupo*, or princess

Thus as the individual develops he is taught to be sensitive to rank and precedence; but at the same time he serves in a variety of roles, both inferior and superior. Since the individual is treated in accordance with the role that he happens to be playing at the moment rather than in terms of some constant and fixed personal attribute, his duties and privileges do not tend to develop invidious personal comparisons.

The organization of the household The village consists of from thirty to forty households, each household ranging from eight to fifty persons. Related to their *matai* by blood, marriage, or adoption, the membership of the household changes from time to time. The moment any member desires to move out and take up residence under the protection of another *matai*, he is free to do so. It is this household group that works in collective fashion, raises crops, fishes, looks after the young, contributes to the village ceremonials, and shares in the fruits of common labor

The children born into such a household come very near to being the children of all the adults. Any older person can command a younger or discipline him. An infant's aunt will nurse the child at her breast when he cries as readily as she would feed her own child. Although blood ties are well-remembered, it is seldom that all of the children of a biological family will remain under one roof during the entire period of their development. Samoan life is organized but, from our standpoint, loosely organized.

Authority and sanctions The individual who offends the village (for example, by committing adultery with the chief's wife) may be banished, his house burned to the ground, his pigs killed, his crops destroyed. A man

who does not cooperate with a work group may be forced to leave the group, or the village Fines, or onerous tasks, may be imposed upon the individual who wishes to be accepted once more by the group; but since he can move to another village easily, his acceptance of the council's decision is testimony of his desire to remain where he is. The same point holds with reference to the *matai's* authority over the household members, it has force, so long as the members choose to remain under him; the moment his pressure becomes unpleasant or unprofitable the relationship can be severed. If the *matai* were to take too strong measures his household would grow weak, his work-group too small.

If the Samoan violates "good form" too often, he expects the spirits of his ancestors to take offense and to retaliate; and when misfortune visits him it is apt to be interpreted as due to such spirit-action. Thus, in addition to the gentle and somewhat elastic pressure of human authority, the Samoan is kept within the boundaries of custom by a set of supernatural sanctions in which he believes utterly. If he has failed to provide what any good Samoan would recognize as an adequate funeral for a relative, he will become keenly conscious of this fact when some misfortune publishes to all the guilt he has secretly felt. In a household in which there have been many deaths from illness the Samoan will become conscious of the excessive quarreling which, he is sure, must have offended the spirits, and pressure will be exerted upon the offending members as a matter of family safety. Through the actions of the living believers the supernatural beings become active participants in village life.

The ideal Samoan Judged by his own system of values, the ideal Samoan is one who knows his place, is familiar with good ceremonial usage, is a willing collaborator in the work-group. Samoans dislike the trouble-maker and the overly ambitious. They disapprove of precocious youths who "talk above their age" or who aspire to more authority than is proper for their age.

The ideal Samoan is not "a man of property." Food is to eat, or to use in ceremonial exchanges connected with a marriage. Mats, bark cloth, and other possessions have both their practical and ceremonial values. But there are enough supplies, enough helpers, and well-established customs of sharing, so that there is no need to hoard or to provide for an uncertain future. There is enough land. The simple houses are easily constructed. The supporting kinship groups, operating according to the folkways, are adequate "insurance." And since the principal ranks in the village hierarchy are hereditary, possessions are not a means of securing status. Even skill in oratory and craftsmanship are of limited value and must be displayed with caution.

lest the villager alienate his peers. At best, skill gives the individual a role when that particular skill is wanted. It does not give permanent status. Indeed, the Samoan does not seem to crave status. No threats to his security, no depressing invidious comparisons create the "need to be first," the need for security-giving power.

The education of the Samoan child By the time a child is six he begins to be a useful member of the household, and tasks are assigned to him. Prior to this, his main job is to keep out of sight and hearing. While children are desired, they are not the highly charged sources of pleasure and concern that can be observed in the small, middle-class, American family. Nursed until two years of age, the infant is regarded as simply lacking sense or judgment. Time, alone, will improve him; and he is allowed to mature with a minimum of care and concern. His nurses, girls of from six to eleven, keep him out of danger and out of the way of adults who have more important concerns. If his cries interrupt the *matai*s, in council session, the nurse is reprimanded, not the child. Out of earshot of the elders he can have his tantrums. His early education is largely a negative one. The rest is left to growth, to chance, and to his own curiosity and powers of imitation. By six he walks, talks, swims, climbs trees. He can split cocoanuts, catch crabs, run errands, carry water, borrow fire.

Samoan parents The Samoan parent would never think of showing concern as to whether his child is as bright as the one next door. In fact, Samoans blush when their child shows precocity; for "talking above one's age" is regarded as an offense against decency. Precocity is feared rather than courted, muted and discouraged rather than striven for. No Samoan mother teaches her child nursery rhymes in order to display his powers before guests. The pace of development tends, therefore, to be set by the slowest ones in the neighborhood group. The *good* child is one who never calls attention to his precocity.

Actually the Samoan mother seldom knows the exact age of her child. She can tell which one is older, and this is important, for relative age is the basis of precedence and authority as well as for the division of labor. She is not conscious of "norms" which the average three-year-old should attain. Educational goals are simple, apparently within reach of all; and the tuition is equally simple. Mission schools found that they had to accommodate their methods to the Samoan views of development; for any attempt to give the brighter pupil *good* reports, to permit a younger child to pass an older one, caused the parents of the accelerated child great pain and embarrassment.

The Samoan personality Nursed and cared for by "the mothers" rather than watched over with concern by one person to whom he is tied by blood, free to transfer his residence to a related family group the moment pressures within a household grow too intense, absorbing the beliefs and values of an extended household (instead of finding out about the world through the channel of two highly individualized parents, as in our culture) the Samoan child emerges with a less sharply differentiated personality. Samoan education tends to minimize the existing individual differences, to give few occasions for rivalry and jealousy, to set simple goals within the capacities of the slowly maturing child. The various roles played by the Samoan are assumed and laid aside as the occasion demands and as his age and skills dictate. They are neither important enough nor fixed enough to become internalized as an integral part of his personality.

The flattening out of the personality has its counterpart in the Samoan lack of strong interpersonal preferences. Even his vocabulary, in describing his friends, seems to lack discrimination, for he describes them in terms of the objective categories of age, physical qualities, family ties. He does not use the comparative form (such as better, wiser). And his friendships strike us as shallow, of short duration. They seem to be formed on the basis of the objective categories or upon the requirements of the work party, rather than upon highly selective preferences for a particular kind of person. We can understand, therefore, that the romantic attachment—if, indeed, Samoan sex relationships can be so designated—is less personal, more physical, and less permanent than in our own culture.

Samoan adolescence interpreted In such a permissive and undifferentiated environment the Samoan boy and girl pass through the adolescent years into a maturity of unquestioning conformity, and with little of that "storm and stress" that is found in our culture. Adolescence is as casual an affair as the rest of Samoan life. Sanctions are so lightly applied, the tasks imposed are so simple, and invidious comparisons so seldom made, that the feelings of guilt, the soul-searching, the struggle "to find one's self," simply do not occur. Conflicts about religion and morals, conflicts concerning a career, or over the choice between marriage and a career, are non-existent. The developmental highway is broad and clear, the traffic moves in leisurely fashion, there is no question as to the destination.

Another factor contributes to the lack of emotionality. The "facts of life" are well-known before the physical changes of adolescence occur. Death (and the rapid decomposition of the body under tropical conditions) is no mystery to the young. No one thinks of concealing it from the children, and they take a

very matter-of-fact attitude toward it. Many births have been witnessed by the time the child is fifteen, for it never occurs to the elders to protect the children from this knowledge. There is no period of "delayed innocence" "Scouring the village palm groves in search of lovers is one of the recognized forms of amusement for ten-year-olds"² There is no attempt to keep the child unsullied and "pure" Hence the adolescent is not shocked by a sudden revelation of the truth about adult behavior His curiosity has never been whetted by secrecy or fear Because of these facts (and because of the lack of individuation in the Samoan personality) the emotions centering about the relations between the sexes lack both the intensity and the impelling urgency as well as the romantic quality that we consider normal.

Sexual taboos rest lightly upon the Samoan The human body and its functions offer no mysteries where adults are scantily clothed and children wear nothing at all Mead reports that masturbation is an almost universal practice among children, that casual homosexual practices prior to the establishment of heterosexuality are permitted, and that a period of heterosexual experimentation before marriage is sanctioned by custom (although excessive promiscuity is frowned upon) Adultery, though not institutionalized or openly countenanced, is not infrequent It does not lead, of necessity, to divorce The outraged husband may be placated by the presentation of a mat

Margaret Mead's studies of South Sea culture began to appear in the late 1920's The Samoa described in these studies remained fairly stable until the full impact of Western culture struck the islands during World War II Today, the question is whether any of the Samoan values can persist against pressures from without

Colvin Hollow

We need not go to the South Pacific or to strange races of men to see personality patterns that offer contrast to our own Within a hundred miles of our national capitol there are backwoods communities which, in the 1930's, preserved almost unchanged the speech, the ballads, the domestic arts of pre-revolutionary colonial America

Samoa has changed since the 20's and 30's, and somewhat similar things have happened to Colvin Hollow³ The insistent quest of the draft board and the growing network of concrete highways—as well as the missionary zeal of men of good will—have penetrated the hollow. It now appears that this particular sample of deteriorated early American culture may disappear Its interest as a case study remains.

The geographic environment When Sherman's group entered Colvin Hollow in single file over a narrow mountain path the children of the village had scuttled out of sight, for a rumor had spread that strangers were coming to take them away to school. One who was detected was lured from his hiding by the sight of a proffered plug of chewing tobacco, a delicacy as highly prized as candy by the children of the hollow. Living in one-room, mud-chunked huts, the families cultivated an acre or two of hillside land. There were few domestic animals; one family had a pig, another had a horse.

Colvin Hollow had been founded over a hundred years ago by settlers of English and Scotch stock who had arrived in this country too late to occupy the more fertile valleys near the coast. The settlers who entered the hollows intermarried for generations and learned to adapt themselves to their limited resources. The somewhat fragmentary culture they brought with them, unsupported by stimulation and contact with the outside world, steadily deteriorated. No one in Colvin Hollow could read or write, and none received mail.

A deteriorated society Logging and hunting had run thin. Rarely, one of the hollow folk would attempt to establish himself beyond the valley, and would be lost to the hollow. Others in the village who had made similar attempts had returned, finding the adjustment outside too difficult. They preferred, so they said, the freedom and the easy life of the hollow where no one rose to a factory whistle and where a man could be comfortable in old clothes and among friends. For the most part no one in the hollow was dissatisfied. The village youths did not yearn for the "bright lights." Few, indeed, had even seen an electric light.

Growing up in the hollow Birth and death in Colvin Hollow were as matter-of-fact affairs as in Samoa. The bamboo knife of the Samoan *matat* which cut the umbilical cord of the newborn was here replaced by grandfather's pocket knife which he used to cut his plug of tobacco. And the one-room mountain cabin offered about as much privacy as a Samoan hut. Nor were the standards of cleanliness much higher. A winter visitor (with American middle-class "sensibility") found the odors and the grime in the stuffy cabin a severe ordeal, and he marveled at the fatalistic indifference, the protective dulling of sensibilities, which mercifully protected these villagers.

The children survived in spite of the poor hygienic conditions, subsisting on diets limited in both variety and amount. On the Baldwin-Wood scale of physical growth they were somewhat retarded, scoring 91 as against the normal 100 for metropolitan children. The hollow folk themselves were, of

course, blissfully unaware of this retardation. When the outlanders came in to measure, to vaccinate, to stick needles into the children and to peer down their throats (bribing those who coöperated with gifts of toys and tobacco) they were received with an uncomprehending suspicion. No purpose seemed to be served by such strange carryings-on.

When these mountain children were asked to name the things they desired most, they mentioned a few simple things—candy, clothes, toys, money. They were satisfied with their environment and with their homes. Asked what they wanted to be when they grew up, they were quite puzzled. One answered, "I wants to be what I am." Conditioned by their limited life, their anticipations were equally narrow and fixed. The conflicting possibilities that confront a metropolitan child did not exist, even in imagination. No Colvin Hollow girl was torn between marriage and a career, between factory and office. Nor did she dream of Hollywood, or of being an airline hostess. The girls simply expected to become "wimmin." The round of child-bearing, cooking, hoeing, confined their imaginations as effectively as the hills limited their geographic world.

Freedom from worry The adults impressed the psychiatrist as being placid, complacent. No one worried about a job, about bills. Life seemed to be so near a vegetative existence that the nervous and muscular tensions were never raised to the point where the individual became conscious of them. In the hollow the habits were of such an easy going order that long before any serious fatigue could arise, the mountaineer "jes' rested." He was incapable of understanding why anyone should drive himself beyond his physical inclinations.

And the housewife never fussed about soiled curtains, or the marks of sticky little fingers upon the wallpaper; there was neither wallpaper nor curtains. This general air of untidiness and lack of concern undoubtedly lowered the level of tension for the smaller children. And the older children never had to worry about the note the school-teacher might send home, for the parents had very little interest in what happened at the school house; and they could not read the note, in any case.

Education and mental growth Mentally, the adults of Colvin Hollow were children—at least by our standards. When the new schoolteacher, distressed by the home background of her charges, tried to get the mothers into the schoolroom for a discussion of some of their problems, she found that the story of *Goldilocks and the Three Bears* offered the best bait. Ten times, on as many separate occasions, the same mothers asked to hear the story;

and each time they seemed as eager and interested (even to the point of spitting out their tobacco as the story neared its climax)

Measured by the tests developed for the metropolitan areas, the children of the hollow performed at the level of the feeble-minded. When the new teacher reopened the school, however, she found that the children could learn school subjects, though slowly. A study of the *differences* between the children revealed that, whereas in the normal community these differences tend to increase and to grow more striking with age, in Colvin Hollow the dull and the normal tended to arrive at the same developmental goals. Both the absolute and relative retardation of the age groups increased as they were studied in the older age samples. The depressing effect of the culture was cumulative. even the dull-normal *capacity* of the six-year-olds seemed to have declined by their fifteenth year.

The finer things of life The Colvin Hollow conceptions of love and morality, like those in Samoa, were crude and simple. The young people did go down to the nearby valley to be married, it is true, and once married they tended to stay married. But there was little depth of feeling between the partners. Jealousy, idealization of the mate, profound and lasting grief at the death of a partner, these are reactions the observers did not note. There was the same flattening of emotions, the same lack of concern over infidelity, the same lack of active concern on the part of the adult community in the prevention of premarital sexual experience that we saw in the South Seas. As in Samoa, we can speak of sexual behavior; but not of romance.

The maximum amount earned by the head of a Colvin Hollow family was \$160 for the year. Some families sold flowers or berries at a nearby summer hotel. The men cut corn, picked apples, in the nearby valley where there were more prosperous farmers. Their own fields produced corn and cabbage, and these were supplemented by limited purchases from the grocer at nearby Oakton. There was some hunting, and in the winter—interspersed with “just settin’ ”—four or five baskets might be made in the course of a week and sold for forty cents each. Neither work nor play was organized or systematic. Card playing was unknown to the hollow. Life, during the winter, seemed nearer to vegetating than living. Its description reminds us of a kind of human hibernation, interrupted by just enough wood-cutting to keep warm.

The study of Colvin Hollow, like that of Samoa, suggests that what we call human nature is a social achievement. Here, where the cultural pattern seems to have undergone a kind of disintegration, and where the interpersonal pressures now fail to stimulate and motivate the individual toward achievement and understanding, the *motivation* of the individual has dropped to a

low level. In Colvin Hollow human organisms experience the same hunger, the same cold, the same endocrine incitement as are everywhere characteristic of the species; but these instigations, or stimuli, do not lead to high endeavor or to long-term plans for the future. The hollow folk do not experience the fretfulness and frustration, the worries, the neuroticism, the feelings of inferiority that haunt the city-dweller who struggles to keep up with the Jones's. But for their freedom from tension the mountaineers pay in the dulling of sensibility, the flattening of emotional life, feeble intellectual endowments. The dilapidation of the culture is matched by a dilapidated human nature.

The Zuñi Indians

The geographic environment In western New Mexico, approximately two thousand Indians live in Zuñi Village and in small adjacent settlements.⁴ How long they and their ancestors have dwelt here on the borders of the river that bears their name, no one knows precisely. They were there when the Spaniard Coronado visited the territory in 1540; and their culture has remained almost without change in spite of the missionaries who came to convert them to Christianity, and in spite of the salesmen who brought sewing machines, automobiles, and "firewater."

The entire communal life of these people is deeply infused with religious feeling, with a sense of the spiritual and supernatural, and the ceremonial calendar which regulates the succession of rites marking the passage of the seasons seems to control the ebb and flow of their days. That their constant prayer is for the blessing of rain seems to the stranger a natural reflection of the climate of their arid plateau, although for more than half a century a government irrigation project has effectively removed the basis of any tribal anxiety from this source. Their fields and orchards yield maize, beans, squash, wheat, melons, peaches, and their growing herds provide a surplus of marketable lambs and wool so that when shearing time is over, in June, they are able to buy needed supplies (including furniture, kitchen utensils, guns, and even an occasional automobile).

Material possessions Although the personal possessions of the Zuñi are not inconsiderable (a string of turquoise beads valued at \$700, a dress worth \$35, a pair of woman's moccasins worth \$100) and although a kind of individual ownership of fields and herds is recognized, there is no marked drive to accumulate wealth or to become a "man of property." It is not in this direction that Zuñi life is oriented. Custom does not sanction any pattern of progressive accumulation whereby surplus products are converted

into working capital and ownership becomes a means of control over the labor of others. Instead, the man of substance shares his wealth with an extended family and clan; or he provides the new house and the food for the Shalako ceremonies at the winter solstice together with presents for the laborers and the dancers. Such a man wins affection rather than prestige; and the villagers regard him not as one who displays his power by his gifts but as one who brings blessings upon the tribe, as one who is pleasing the ancestors, as one who has a "good heart." Differences in wealth, under this system, tend to remain relatively small, and temporary.

The Zuñi Household From his birth until his death the Zuñi is bound within a framework of collective activities. The household into which he is born is the principal economic unit and consists of a mother, her husband, her daughters, and their husbands and children. To these may be added unmarried sons, sons who are divorced or widowed. In this extended household, living in perhaps a half dozen rooms, there is no single head or source of authority, unless it is the elder women of the household. The man who becomes a member of the household through marrying one of the daughters remains "on sufferance" for a period. Until the years of his residence have demonstrated the permanence of his status he is almost an outsider, an interloper, who may depart at any time carrying bits of household gossip.

Training the child in Zuñi ways It is this extended matriarchal household that assumes the care of the young and carries out the main agricultural tasks. As in Samoa the two parents of the child are but two among many who watch over the youngster. The very name for *mother* is the same as that employed for *mother's sister*, and the fact that the women of the household freely nurse one another's children shows that the lack of verbal discrimination has its parallel in behavior. Unlike the Samoans the Zuñi expect their children to take on adult ways rapidly, and they apply pressures of a mild sort to accomplish this. They do not use whipping or physical punishment at all. (The very suggestion that this might be done excited in them the most profound revulsion and contempt.) Instead, they employ both rewards and shame. When the boys are about nine they are allowed to assist in sheep herding (which they enjoy); and as they grow older and show that they are able to carry the responsibility, their fathers (or uncles and cousins) give them a few sheep of their own each year until their herds are established. But if a boy should choose to play, or otherwise to behave in an irresponsible manner, he is shamed; the epithet "childish" has a value similar to that in our own culture. As he grows older it is made clear to him that the

man who is irresponsible, who shirks his work, makes a poor husband. A good Zuñi, he is told, is a hard worker; the girls will like a man whose shirt is wet with sweat.

In addition to the satisfying expansion of his ego that comes with adult status the youth finds good company in the working party. Jokes and pranks enliven the rest pauses, and a "good-Zuñi-feeling" suffuses his spirit as he files back to the village in the evening with the group and joins them around the steaming bowls of stew.

Effects of collective ownership The products of the fields tilled by the household, whether they are individually or collectively owned, are pooled in the family storeroom, over which the women of the household assume complete charge (and into which no male may enter). If there is a surplus of any commodity the women exchange it for other necessities of the household.

The pooling of labor and agricultural products, the joint responsibilities for the care of children, the constant redistribution of goods, all contrive to produce an adult whose mind turns readily toward collective needs, collective actions, collective goals. *As an individual* the Zuñi takes little thought for the morrow. Cooperating in the work groups he looks to the common wealth to nourish him. In his shared life he feels secure. His value as a person depends more upon his "good heart," his willingness to participate, than it does upon skill, status, possessions; and those who have lived among the Zuñi agree that he does not seek these goals. He loans his few personal belongings freely, and although individual ownership is recognized it is not given great importance. To hoard material possessions, to display his wealth, would be both shameful and stupid. Thus the adult Zuñi who emerges from the socializing process is coöperative, easy-going, ready-to-compromise, remarkably deficient in acquisitive impulses. Occasionally, the anthropologist reports, there appears among them a selfishly aggressive individual, interested in possessions, status, power, but he is always isolated, regarded with distrust and suspicion, heartily disliked. In some instances he is accused of sorcery. In former times such a man was hung by the thumbs until he confessed the name of the spirit responsible for his "abnormal" behavior.

Collectivism in religion Zuñi religious ceremonies, the major interest of the adult community, are also free from any note of tragic intensity, any implication of *individual* guilt, any thirst for *individual* salvation. The spirit world (which he senses everywhere about him) is not shot through with the antithesis of good and evil. There is no devil to be wrestled with; nor is

there any intensely loved ideal of perfection to fill him with a sense of his own unworthiness. The spiritual world is very like his own world, peopled with beings neither especially friendly nor especially hostile, neither good nor bad. To be sure, the spirits can be displeased by departures from the folkways, and they sometimes withhold their blessings. In such cases rituals are performed to bring them around. In time of drought there was formerly considerable anxiety on the part of the priests; and a ritual failure would mean the meticulous repetition of the ceremony with special attention to all taboos. Commonly, however, the ritual relationship with their ancestors is similar to a free conversation, to cajolery. They hope to please and entertain them with their dances.

Zuñi religious beliefs are woven into the fabric of their communal life. They provide the framework within which the Zuñi thinker deals with his problems. They persist in the face of many corroding influences, supported by collective ritual and in turn endowing their tribal life with meaning. Confronted with ritual failure the priest does not abandon his religion but seeks to find the violated taboo, searching his own memory or accusing a fellow priest of ceremonial lapses. Confronted by missionaries who are willing to reveal their rites and "give away" their prayers, he remains skeptical. This is one area in which the Zuñi remains "selfish," secretive; for he believes that such revelations would dissipate all the magical power of prayer and ritual. He *knows*, therefore, that the missionary is not telling the *real* secret of his religion. The fixity of the Zuñi's concepts is thus a fixity of a way of life; it is tied up with steaming bowls of stew, the laughter of working parties, the affection of the village for his good heart. The impeccable logic of Thomas Aquinas does not touch him.

The Kwakiutl Indians

The geographic environment The Kwakiutl Indians of Vancouver Island, British Columbia, were a sea-going fisher-folk, plying their 60-passenger cedar canoes for hundreds of miles along the rivers and sounds of the heavily wooded Pacific coast.⁵ By 1904, epidemics and tribal wars had reduced what had once been a population of 20,000 to 2,173 members.

The food supply was abundant. Salmon, halibut, candlefish, seals, sea lions, and an occasional whale were taken from the oceans and rivers in such quantities that the winter's surplus was easily accumulated. To these they added shellfish, sea urchins, herrings, and codfish. What they did not consume at once was dried for winter use.

The forests and mountains furnished them with berries, roots, lumber, and game. Deer, elk, black and grizzly bear, wolf, mountain goat, beaver, otter, marten, mink were hunted and trapped, providing meat and hides

From the logs of the red cedar trees they fashioned not only the canoes for war-making and fishing, but also the planks, posts, and rafters for their one-story houses. These houses (about 40 feet by 60 feet) provided quarters for a group of families, and each family had its own fireplace, settee, food supplies, sleeping quarters. A group of these houses extending along the waterfront constituted a village

The rationale of Kwakiutl existence Like the Zuñi, the Kwakiutl did not find their main interest in their economic pursuits. Once their brief work season was over they were free to turn their attention to more interesting pursuits. Played out, in part at least, with the same material goods that had been accumulated with an eye to the winter's needs, some of the winter activities involved wholesale destruction of these goods. In contrast with the milder Zuñis the religious and magical ceremonials took on a terrifying and frenzied character

If there is any single pattern of behavior that distinguishes Kwakiutl society it is the struggle for prestige, typified by the potlatch feast. Calculated as a means of validating the egoistic claims of the great ones of the tribe, and intended to fill the rest with envy, resentment, and insecurity, these feasts caught no fish. They contributed nothing whatsoever to the tribal welfare. Nevertheless, they were the channels through which the main drives of Kwakiutl existence flowed. They provided the Kwakiutl with his main interest in life. The battle with nature was soon won, and on easy terms; but the battle with his fellow man involved the Kwakiutl in an endless round of contests in which permanent victory could never be won, and in which the striving of each contestant contributed to the insecurity of all the others.

The social structure Most of the positions in Kwakiutl society were fixed by birth. Each tribe, *numaym*, and family, possessed a certain honorific position. The *numaym* was a grouping of families descended from a common mythical ancestor, and the power of this ancestor was thought of as descending upon the chief of the *numaym*.

The very names of the *numayms* suggest the Kwakiutl emphasis upon social status. In translation, the names suggest the frank egotism of the boys' club, openly declaring pride and vanity in their possessions—for instance,

"those-who-receive-first," "the great ones," "rising-above-other-tribes," "whom-no-one-dares-to-look-at." Though conferred by birth and supported by the mythical ancestor, the status of the Kwakiutl required continual validation. In former times the chief had proved his claim to power by deeds of valor and by physical combat; but when Boas visited them he found that prestige was maintained by the potlatch and by the initiation ceremonies, with their attendant distribution of gifts and destruction of property. A property fight had replaced the physical test of greatness.

Within the tribe each individual had his rank. He was a noble, a commoner, or a slave. If a slave, he did not count as a person, being treated as property rather than as a human being. He could be sold, traded, or killed as a ceremonial victim. The nobility included the first-born of each family, and upon these first-born were conferred the great names that carried the right to certain seats at the ceremonies, the right to perform certain dances, the right to be served before others at the banquet. In his name the Kwakiutl noble expressed a humorless and uncensored self-glorification: "creating-trouble-all-around," "the-great-one-always-alone-in-the-world," "giving-wealth," "about-whose-property-people-talk," and the like. Since the really important names in the clan were limited, the Kwakiutl scheme of inheritance kept the nobility and the commoners forever separated.

Kwakiutl marriage Marriage, for the Kwakiutl noble, was closely integrated with the eternal battle for prestige. At a ceremonial feast a chief's daughter would invite the sons of chiefs to note her coppers, blankets, names and privileges, and they were challenged to make a reasonable offer. The negotiations for marriage strike us as about as full of romance as a proposal for a merger between two oil companies. The eternal game of property had swallowed up the individual.

The bridegroom had to pay for the crests, dishes, coppers, names, dances, his bride brought to him. The most frequently used counter in such exchanges was the blanket, and when hundreds of these were involved a cheap Hudson Bay Company blanket valued at fifty cents served as the standard unit of exchange. For the pile of blankets offered by the son-in-law the father of the bride gave his daughter as a first installment, a down-payment. The crests, names, privileges came later as the children arrived; and the son-in-law's blankets were also repaid, with interest. The interest rate rose as the second child was born, from 200 per cent to 300 per cent. These return payments made by the girl's father "annulled" the marriage—that is, cleared the father-in-law's name. If the bride stayed on now it was of her

own free will The son-in-law, to maintain his prestige, had to make further payments since he did not want a "worthless" bride. He would have lost face otherwise.

Privilege and prerogative At every turn the Kwakiutl was taught his place, taught to respect his betters or, as one of the betters, to demand his prerogatives from those who were his acknowledged inferiors. The seating at the feast was arranged with all the care that would surround a diplomatic event in our society; and the Kwakiutl was quick to resent any deviation from the correct order of seating, serving, name-calling, distribution of gifts. Being always somewhat insecure, his anger and resentment were near the surface.

As a noble his dress was different, and he had other privileges. He was served the choicest bits of food. He was given a share of any game brought in. The hunter of seals kept one, the rest went to the chief of his *numaym*. Of ten mountain goats, the chief received five; of a hundred salmon, twenty

In return for his prerogatives the chief gave feasts for his people. In fact he was *required* to do so, for only thus could he validate his claims to personify a powerful mythical ancestor, his claims to a position among the highest chiefs. The need for such constant validation of his claims furnished the underlying motive behind the greed of the ambitious chief, and the public validation of his powers made him the more arrogant in his demands. Frequent quarrels between the chief and his dependants testified to a constant uncertainty in their relative powers. At his great feasts and purchases of coppers the commoners could bask in the reflected glory of their chief, but the heavy and continuous tariff he levied upon their labors was a constant source of irritation. So, too, the constant recognition of social differences, and the aggressive claims at the potlatch ceremonies, generated counter aggressions. The Kwakiutl carried a chip on his shoulder.

The potlatch The Kwakiutl's obsessive interest in attaining prestige found its most effective expression in a ceremonial distribution of property. It was this potlatch ceremony that kept the great names great. If a man failed to give such a feast, even though his name was a great one, he was not mentioned in the roll-call of the titled nobility at a subsequent potlatch. To cover his shame he had to distribute property, break a copper, destroy valuable possessions, give a feast.

The giving of property at such feasts was done in a spirit quite different from that which prevailed at the winter ceremonies of the Zūñi. The Zūñi

were one-way givers, giving out of their goodness of heart. The Kwakiutl institutionalized their giving so that the recipients had to make repayment, usually within a year, and with interest. These public gifts were noted and remembered, and whoever failed to return the amount with interest (usually 100 per cent) was thereby "flattened," and the name of the donor became correspondingly great. A note of calculation and aggression entered into the feasting and property distribution.

The supreme expression of power was the potlatch feast in which goods were *destroyed*. Canoes were broken, slaves were killed, blankets were burned, candlefish oil was poured on the fire. As the huge blaze of the destroying fire fairly singed his guests the Kwakiutl host felt that he was burning a sense of his might and power into the minds of his guests. In response to this open and wanton destruction of goods his rival had to make an equally magnificent display if he was to retain prestige. If Thorstein Veblen had wanted a classic illustration of the operation of his principle of conspicuous waste he could not have secured a better one than that furnished by the Kwakiutl.⁶

The child becomes a competitor A child entered this battle of property when he was a year old. At this time he dropped the place-name which had hitherto been his title. In order to validate his second name the older relatives gave a paddle or a mat to each member of the clan. At ten or twelve, when a third name was taken, there was a distribution of blankets, shirts, and other gifts. He borrowed heavily to make these gifts, and the debts incurred had to be repaid with interest. Those who received his gifts had to repay at an even heavier rate of interest, and earlier. Whereas he had to repay at the end of a year, at 100 per cent interest, they repaid within a month at 300 per cent interest. Thus when the next year rolled around he was able to discharge his obligations easily; and he now possessed a surplus with which he could enter future property contests. As soon as he could validate it, he took his potlatch name; and his father, who had held it, now stepped down to sit with the commoners at the feast.

In the nature of Kwakiutl folkways, once an individual had entered the round of borrowing, potlatching, interest-paying, he was kept endlessly at it. Meaningless though the game may appear to us, it was the preoccupation of the "best people" among the Kwakiutl. They did not actually use the blankets that changed hands so endlessly; it was the insatiable appetite for the "psychological income" accruing to the potlatch victor that kept them at it. It is said that although the Canadian government has officially put a stop

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to the custom it is continued in secret, the Indians using worthless checks on non-existing bank accounts.⁷

Ceremonial life The contrast between the Kwakiutl personality and that of the Zuñi is nowhere better illustrated than in the kind of gods he possessed. The friendly, cooperative Zuñi has a supernatural world as kindly disposed as he is. The Kwakiutl was surrounded with warlike gods, with spirits who infected the living with disease, with cannibal spirits who pursued and devoured men, with raven-like spirits who ate the eyes of those whom the cannibal spirit devoured, with long-beaked spirit-birds who destroyed houses, canoes, and all manner of valuable property. The spirits that possessed their human representatives in the ceremonial dance forced them to dramatize violent, disgusting, blood-curdling actions. The Kwakiutl participants summoned, cajoled, cursed, defied, insulted the spirits, and in turn they were themselves frightened, driven into a frenzy.

The initiation rites of the highest order of nobility culminated in a dramatic simulation of cannibalism. The candidate, simulating a mad lust for human flesh, would fall upon a specially prepared corpse, or attack the spectators with his teeth. Following this bit of ritual a functionary brought him quantities of salt water which induced vomiting, and the regurgitated pieces of flesh were as carefully counted as sponges after a surgical operation. While the young initiates danced, their movements were followed by the critical eyes of the ranking nobles. Errors were savagely punished, and if the young initiate who committed a serious error was not killed on the spot, he was forced to repeat the ritual and the members of his family had to provide further presents and food for the assembly. Like their secular life, the religious life was an avenue to individual prestige. The roles were ranked in an order of merit. The dances were owned, jealously guarded, and transmitted to their first-born. In his contact with the spirit world the Kwakiutl was the same eager seeker after prestige that he was in his potlatch feast, in his breaking of coppers.

Shot through with aggression and rivalry as Kwakiutl life was, even death found him quick to react with resentment as to an insult. A death in the family called for revenge. In one instance a chief, informed of the death of his sister in a canoe accident (caused by the drunkenness of the occupants) called his men together and asked, "Now I ask you tribes who shall wail. Shall I do it or some one else?" And he promptly made up a war party which fell upon a sleeping family of five, killing four and making the fifth a captive. Such a returning war party asserted that they "felt good."

THE ORGANIZATION OF THE GROUP AND THE INDIVIDUAL'S LIFE STYLE

We have looked at four societies within which the individual members possess many traits in common. A closer examination of each group would show many individual differences. Not all Kwakiutls are alike. The fact that the Zuni developed a specific method for treating the occasional aggressive individual also indicates the fact of divergence. The gross contrasts remain, and we may summarize the facts we have observed in the following generalization: *The cultural matrix within which an individual develops and grows to maturity has the power to enforce a characteristic pattern of behavior and belief.* Most individuals neither transcend nor deviate from the prevailing pattern to any marked degree. Deviations are punished. the Samoan punishes those who talk above their age, the Zuni suspend the aggressive ones by the thumbs, the Kwakiutls shame those who fail to compete successfully, and Colvin Hollow husbands shame their wives if they get "fancy notions" (for example, if they should expect special consideration at childbirth, such as "hotel leydies" get).

Our Generic Human Nature Offers More Potentialities than the Culture Uses

That each culture has to apply sanctions in order to produce conformity suggests that there are impulses in the individual members which run counter to the cultural goals. Human nature has greater and more diverse potentialities than any one of these cultures uses, more impulses than are permitted to come to full expression. Each culture amplifies, exaggerates, rewards certain traits, and these become the main avenues of growth. Other traits are violently repressed, punished, shamed. Some are simply neglected.

The culture that does this rewarding and punishing is not an abstraction floating in the ether, it consists rather of the preferences and dislikes, the actions and beliefs, borne by human agents who work actively upon the young under their tutelage. By their active molding of the young they create the forces that perpetuate the culture.

Values of the Culture Appear Absolute to Those Who Belong

In each of the cultures we have examined, this process of selection and coercion is given relatively little thought. The customary and sanctioned ways seem to the members of the tribe to be eternally right and fitting: they

seem so *natural* that no one questions them. If the Samoan allows his child to develop at his own tempo it is because he also believes that this *must* be done; it is in the nature of things that children acquire sense and usefulness slowly. And the Zuni stamps out all signs of aspiration for aggressive leadership in the young, warding off any outcropping of the competitive spirit as he would a visitation of an evil spirit, and much in the same spirit with which we would try to protect a child from an infectious disease. No good Zuni acts in an aggressive fashion. The cultural pattern is ultimate, necessary, natural; and deviants are therefore treated as something less than human, irrational, dangerous, or despicable.

This cultural pattern, once internalized, has the power to defend itself against rival patterns. The son of Colvin Hollow, once his life style is well established, will look upon all outlanders as people who do not know how to live. He will find their ways uncomfortable, and he may wonder whether they have not been made foolish by their long habituation to factory whistles. To him, acquisitive striving and prolonged and regular seasons of work are almost an indication that the city dweller is not quite bright.

Self-verifying character of tribal myths Most cultures also project into the unseen world about them a supernatural world which is a kind of mirror-image of their own feelings and beliefs, a projection of the culturally sanctioned personality. It is to this supernatural world that they turn for their ultimate authority for their way of life, unaware of the circular character of such self-validation. Into this unseen world, of which the barest glimpses can be obtained in the frenzy of the ritual or in the visitation of the dream, the culture projects its own characteristics and draws, in turn, what it deems to be a kind of spiritual nourishment and support. Like the insane who sometimes find proof of their unique powers and missions in the hallucinatory voices that speak to them, the Kwakiutl create a spiritual hierarchy that is closely patterned after their tribal life. They endow the spirits with the same hostility and aggressiveness that characterize their own make-up. Terrifying themselves in the ritual of the initiation ceremony, they find a validation of these projected beliefs in the power and frenzy that seem to seize them in their dances. They can *feel* the spirits seize them. Let the doubters doubt, the good tribesman *knows*. Tribal myths provide an integration and interpretation of experience, and in the ritual that symbolizes them moods of certainty are generated. They are almost impervious to any contradictory evidence. Each day becomes a fresh demonstration and illustration of the collective tribal wisdom.

The Social Factor in Human Motivation

Our cursory survey has also provided us with an approach to the problem of motivation. In this respect the Kwakiutl stand at an extreme position, contrasted with the three remaining groups. They are a tense, striving, acquisitive, property-conscious, ambition-ridden group, keenly sensitive to social status. The other groups produce individuals who are placid, relaxed, carefree, and in no wise concerned with getting ahead in the world or with getting the better of others. It is true that there are certain biological motivations that will affect any people. Any tribe must find shelter from the elements and from natural enemies. Provision must be made, in the organization of tribal life, for the care and protection of the immature infant. The folkways will inevitably provide channels of expression for man's need for food and for a mate. But how simple the life can be and yet provide for these basic needs! It is at the interpersonal level that we must look for the root-causes underlying an intensification and elaboration of human effort, the more *spiritual* "hunger and thirst after righteousness"; and it is in "man's inhumanity to man" that we must seek the roots of the chronic fears and insecurities, the compensatory strivings that characterize some societies. These inter-individual pressures arising out of the social organization instigate and channel the behavior that we are apt to think of as most characteristically human, civilized.

A Bio-Social Integration

Our examples indicate that biological motivation reaches its full expression within a cultural framework. Under the pressures of divergent cultures the same biological needs are shaped to different ends, stimulated or restricted to different degrees.

Within a culture there are important biological differences. Individuals vary in sex, age, height, weight, skin color, learning capacity, and in temperament. The children of Colvin Hollow, studied by Sherman and Henry, differed in intelligence. Whether the range of *original* capacity is as great as would be found in nearby Washington, D. C., no one knows for certain. It is possible that selective factors, operating in conjunction with the general cultural dilapidation, in-breeding, the loss of the more adventurous members from the hollow, have produced a progressive deterioration in the biological stock. We have no way, at present, of knowing whether this is true or not. But we do know that even the differences that do exist in Colvin Hollow are not developing in the usual fashion, with the years showing greater and greater divergence. Normally, the spread in ability would be

more apparent among the older children, the small differences, barely visible in infants, grow obvious with the years. On the contrary, in Colvin Hollow, the individuals grow more and more alike. The environment does not stimulate and develop the capacities that are there.

Whether or not there are biological differences (as definitely attributable to genetic factors as is skin-color) which also contribute to the differences in outcome of Samoan, Zuni, and Kwakiutl development, we do not know. While we cannot deny that such differences may be found, the present evidence does not make them seem probable or important.

A Concluding Note on the Concept of Generic or "Real" Human Nature

The description of these four societies should do more than remind us that human nature is a plastic thing which takes on different forms under the different cultural matrices. It suggests, in addition, that any sample of human nature we can discover is an already shaped sample. The concept of a pure, or generic human nature—the *real* or *essential* set of forces or potentialities that could flower into something that has not yet existed—arises, naturally, as we observe a few samples from the anthropologist's collection. In each of these samples certain potentialities are favored, and as these are actualized by the specific conditions of the culture other possible goals of development are blocked off. There is a certain either-or, all-or-none quality to the process. The high level of motivational tensions developed in an acquisitive-competitive society precludes the collectivization, the cooperation and low level of individualistic self-interest of the Zuni. For every special flowering of potentialities some contrary possibilities are shut off. Perhaps, too, no hitherto existing society has offered the precise type of organization of needs and cultural pressures to bring the potentialities that are within this human material to its finest flowering.

We arrive, finally, at a vague conception of some optimum development of human talents, some ideal organization of powers and potentialities that would involve a minimum of stunting, a maximum of realization of all that is nascent within us. This somewhat romantic abstraction remains as evanescent as vapor, as difficult to grasp as any concept of the perfect good, the perfect beauty, the perfect truth. If we posit this goal as that toward which every hitherto existing culture has trended (but failed) or if we describe this kind of ideal self-realization as the end toward which every self strives, or if we describe as neurotic, abnormal, less-than-supremely-desirable every alternate actual form of life, we are still unable to derive any values or directing concepts from such a nebulous ideal. The *real* human nature, to whose full

flowering we should devote ourselves—and we would if we were all-wise and all-powerful, or if we had only developed in that never-never-land of Erewhon or Utopia where an optimum environment forces out the best that is within us—is like the *Ding an Sich* of the German philosophers, unknown and unknowable. No variety of culture, no existing form of human life, can be described as *against human nature*, for these forms and varieties *are* the only human nature that we are able to experience, directly.

What we usually mean by our phrases (“inhuman,” “contrary to human nature,” “unnatural”) when applied to particular samples of the human species, is that they are unlike us, that they are repugnant to all who share *our* values; and in this we illustrate one of the basic traits of the culture-formed *genus Homo*, namely, his confidence in and devotion to his own unique set of values. Even when we develop our Utopias, our conceptions of an *ideal* human nature, even when we attempt to transcend our own culture-bound and culture-molded human nature by the bold exercise of imagination, we use as springboards those very material and relative needs and hungers that are uppermost in our *actual* human nature.

REFERENCES

1. A good summary of the facts of Samoan life can be found in Margaret Mead, *Cooperation and Competition among Primitive Peoples* (McGraw-Hill Book Company, Inc., 1937), pp. 282-312.
2. Margaret Mead, *From the South Seas* (William Morrow & Co., Inc., 1939), p. 136.
3. One of four villages described in *The Hollow Folk*, by Mandel Sherman and Thomas Henry (Thomas Y. Crowell Company, 1933).
4. Irving Goldman, “The Zuni Indians of New Mexico,” in Mead, *Cooperation and Competition*, pp. 313-353.
Ruth Benedict, *Patterns of Culture* (Houghton Mifflin Company, 1934).
- Ruth Bunzel, “Introduction to Zuni Ceremonialism,” *47th Annual Report of the Bureau of American Ethnology*, 1929-30, pp. 467-544.
5. Franz Boas, “Ethnology of the Kwakiutl,” *35th Annual Report of the Bureau of American Ethnology*, Part II, 1921.
6. Compare the concept of conspicuous waste in Veblen’s *Theory of the Leisure Class*.
7. Bunzel, “The Economic Organization of Primitive Peoples,” in Boas, *General Anthropology* (D. C. Heath & Company, 1938), p. 359.

PART TWO

Growth and Development

CHAPTER 4. The Inheritance of Capacities and Susceptibilities

CHAPTER 5. The Maturing of the Individual

CHAPTER 6. Chemical Aspects of the Growth Process

CHAPTER 4

The Inheritance of Capacities and Susceptibilities

The preceding discussions point so clearly in the direction of a radical environmentalist interpretation of human conduct that there are many who will want to question the accuracy of the anthropological findings. Although the anthropologists' accounts seem factual enough, they also violate "common sense" when they are offered as the exclusive approach to human conduct, for it is certainly true that there are fundamental and ineradicable differences in human capacities which are not created by the social matrix and which the latter cannot surmount. "Common sense" asserts. "Blood will tell." We are troubled by the insistent question. "How did these different peoples develop their unique traits and social organizations in the first place?" And since the historical answer is commonly shrouded in the fog of tribal myths and we are carried into the speculative realm of prehistory, the final issue is in doubt.

On the other side of the ledger in which we try to balance the influences of heredity and environment we may note that different species of animals achieve their developmental goals at different rates. The queen bee develops from egg to bee in 21 days, whereas it takes the human being 39 to 40 weeks to traverse the corresponding developmental span. Even at birth the newborn infant's action systems are so undeveloped that he is relatively helpless. The neonate monkey, *Macacus rhesus*, is ready to stand and walk on the first day after he is born, and on the second day climbs up the side of his cage. The

fruit fly lives out as great a proportion of his life in a day as man covers in a year Are there other important differences (similar to these) that regulate the pace of life? And are there similar differences within a species that are also dependent upon inherited factors? If so, the differences in our varieties of human nature that we find in moving from tribe to tribe, and even the differences in life style within the tribe, may be due to the inherited, the constitutional, the intrinsic makeup of the human materials.

THREE TYPES OF INHERITED DIFFERENCES

In the following pages, three types of inherited differences will be considered (1) emotionality, (2) susceptibility to mental breakdown, (3) inherited differences in intellectual capacity.

Emotionality

The importance of animal studies For evidence of what is meant by intra-species differences that are transmissible by the mechanism of inheritance let us turn to some of the animal studies Most of the recent advances in our knowledge of heredity have come from such sources, for two reasons: (1) the life span of the animal subject is short, and (2) his matings can be absolutely controlled In two years an experimenter can collect evidence on the inheritance of behavior tendencies in the rat that would require 150 years to gather if similar patterns were being studied in human beings Modern notions of inheritance are so new, records of human ancestry so spotty and inadequate, and human matings so uncontrolled, that we lack a direct knowledge of human heredity in all but a very limited number of cases The result is that we are forced to reason by analogy from the study of simpler creatures.

Observations of the "emotionality" of albino rats Of considerable interest to the psychologist are the studies of Hall, Stone, and others on what might be called "temperament" in the rat Those who handle this laboratory animal know that the albino is much more docile than the gray Norway rat Cross-breeding experiments produce colonies with a mixture of temperaments, mixtures in no wise accounted for on the basis of handling since all of the offspring are allowed to develop in a uniform laboratory environment Even within the albino colony there are differences These differences are not easy to detect or measure, yet Hall has shown that this is possible. Some

of his albinos seemed nervous, excitable. When first placed in a circular observational field these "emotional" animals were extremely active, and the experimenters noted frequent defecation and urination. Other animals seemed less disturbed. Using the urination and defecation responses as criteria, Hall selected pairs of the most excitable animals and mated them. Corresponding pairs of the least excitable animals were selected and mated. The table below presents the records for each generation.

*Indices of "Emotionality" for Parental Strain and for Offspring Selected and Mated on the Basis of Tests for this Trait **

GENERATION	EMOTIONAL	NON-EMOTIONAL	CRITICAL RATIOS
Parental	3 86†		
F1	3 07	.46	4.74
F2	4 72	1 94	2.50
F3	3 92	1 02	6 00
F4	4 69	1 40	7.00
F5	4 96	41	8 44
F6	6 87	51	12 72
F7	7 82	.17	20.40
F8	8 37	1 07	14 29

* Adapted from C. S. Hall, "Temperament: A Survey of Animal Studies," *Psychological Bulletin*, 38 (1941), pp. 909-943.

The values represent the average number of days during which emotional defecation and urination occurred out of a total of 12 days of observation in the test field. The critical ratios indicate statistically reliable differences.

Another indication of the nature of this "emotionality" is afforded by the hungry animal's refusal to eat when first placed in the brightly lighted observational field. Somewhere around the ninth day he has become sufficiently adapted, and at the point where he begins to eat his "emotional" urination and defecation cease. J. T. Evans and J. McV. Hunt, "The Emotionality of Rats," *American Journal of Psychology*, 55 (1942), pp. 528-545.

† Index number for the parental strain prior to selective breeding.

Aggressive and submissive behavior Further observation of the "emotional" animals shows that the indices obtained in the observational field are correlated with other behavior traits. The "emotionals" are also timid. Hall and Klein devised a scheme for rating this trait. A rat that showed little interest in his cage mate beyond an occasional nosing was scored zero. If he blocked, shoved, or crowded the other animal he was given a score of two

If his approach to the other animal included wrestling (assuming a dancing position in which the rats clasped each other while standing nose to nose) he was scored four. Fierce wrestling, with biting that drew blood, was scored six. Out of 72 possible trials in which the behavior of pairs of rats was observed, some animals showed aggression (a score greater than zero on the rating scale) in as many as 53 encounters, whereas others showed this trait on but a single encounter. Five "emotionals" made a total of but 12 attacks, while five "non-emotionals" made 133, and the attacks of the "non-emotionals" were also more severe.¹

Another investigator has been able to show that the "emotionals" tend to make more errors and to take more time in running an unfamiliar maze. Just as they refuse food in the observational field for a longer period, it takes them longer to become adapted to the learning situation. Later tests with similar mazes show that, after adaptation, the differences in learning rates of the two strains disappear.²

Search for a structural basis for "emotionality" That a measureable difference in "emotionality" as here defined is capable of being transmitted by inheritance seems well established by these facts. There have been many attempts to locate the exact structures or action-systems that serve as carriers for these differences, but to date they have not met with success. Impressed by the important role played by the endocrine glands in human emotional behavior, investigators have made a careful assessment of the development of the adrenal, pituitary, and thyroid glands in the "emotional" strain. Up to the present, the evidence is inconclusive. Neither structural nor chemical differences that could account for the observed functional differences have been isolated.

Susceptibility to Mental Breakdown

Incidence of insanity Pavlov, the Russian physiologist, was able to induce a breakdown in the behavior of experimental animals. The "experimental neurosis," as he called it, was sufficiently similar in some of its aspects to the behavior of human neurotics and psychotics to arouse the keenest interest of research workers. The need for more light on the causation of these disorders becomes apparent to any one who reads the pertinent statistics. More than 600,000 hospital beds are continuously occupied by the mentally ill in the United States; of every twenty persons born one is, at some time during his life, hospitalized for mental illness (provided he lives in an area where reasonably adequate institutional care is available).

Studies of the general population indicate that an equal number never come to the attention of public agencies although they are as ill as those in hospital. These figures refer to those with grave mental illnesses, and they hold true for such states as New York and Massachusetts. If the borderline cases of neuroses, alcoholism, stammering, epilepsy, and the like, now treated by the general practitioner (if at all) were included, the total number needing treatment or care at any one time would approximate ten millions.

Those who are professionally concerned with the treatment of this large group of patients have often attempted to explain these mental breakdowns by an appeal to some constitutional, hereditary, factor. Medical statistics are difficult to gather, however, and family records are notoriously inadequate (particularly with reference to the relative who is "queer," or who seems to the family to place a kind of biological blot upon the scutcheon). Until Pavlov and his followers discovered the analogy to the human breakdown in their animal subjects the possibility of an experimental attack upon the problem seemed remote.

Studies of identical twins Perhaps the nearest approach to accurate and adequate evidence in the field of human behavior-disorders has come from the identical twin studies, typified by Rosanoff's research on schizophrenia.* These twins, arising from the splitting of the same fertilized egg, possess the same genetic endowment. It should follow, therefore, that if schizophrenia is primarily a constitutionally determined disorder the appearance of symptoms in one twin should be accompanied by their appearance in the other. Rosanoff's figures show a pronounced trend in this direction, but their lack of complete agreement with the theory leaves room for the consideration of other factors. Sixty-eight per cent of the monozygotic (identical) pairs show the disorder in both members, as against 14.9 per cent of the dizygotic pairs. Since identical twins are also treated alike to a greater degree than the dizygotic there is a possibility of some factor in the interpersonal sphere entering into the development of the disorder. The hereditary factor may be non-specific, acting in conjunction with any material agency (such as disease) that weakens the constitution, or with a combination of psychological factors that retard development and warp the pattern of adjustment.

* The term schizophrenia may be understood, in part, if we look at those to whom it is applied. They occupy half of the bed-space in mental hospitals. Once committed, 60 per cent never leave hospital, and many of those continuing in hospital become profoundly deteriorated, apathetic. They vary in type. Some are excited, troubled by voices that accuse them of vile deeds. Others are mute, motionless, withdrawn. Many are extremely untidy. Their talk is curiously fragmented, meaningless, full of bizarre expressions and newly coined words, their powers of reasoning are very limited. It is difficult to communicate with them, or to establish rapport.

Incidence of Schizophrenic Psychosis in Twins

Number affected	Like sex twins				Opposite sex twins	Total number of pairs
	MONOZYGOTIC		DIZYGOTIC			
	MALES	FEMALES	MALES	FEMALES		
Both affected	10	18	3	7	5	43
One affected	9	4	8	35	(M) 21 (F) 22	99
Total	19	22	11	42	48	142

From A J Rosanoff, Lena M Handy, I R Plesset, and S Brush, "The Etiology of the So-called Schizophrenic Psychoses, with Special Reference to Their Occurrence in Twins," *American Journal of Psychiatry*, 91 (1934), pp. 247-286.

Pavlov's experimental neurosis With the discovery of a method of producing neurotic behavior in animals, more adequately controlled studies of inheritance became possible. Although it is early to draw final conclusions the evidence indicates that it is possible to isolate strains of animals that are more susceptible and to show that this susceptibility is transmissible to offspring.

In the course of his studies of sensory discrimination in animals by the conditioned reflex method, Pavlov found that when the task became too difficult his animals became restless, nervous. If they were pressed continuously beyond the limits of their capacity they suffered something analogous to the human breakdown. The animal that had hitherto entered the laboratory eagerly, running ahead of the experimenter and mounting the table without persuasion, now cowered and whined at his appearance in the animal room and had to be forcibly harnessed, dragged to the experimental room, and confined in the testing situation. On the stand the animal that had patiently awaited the series of stimuli, discriminating between an elliptical patch of light that meant food, and a circular patch that warned of a slight shock (and some animals could carry the discrimination to the point where the ratio of the axes of the ellipse was 8.9) now became excited as though confronted with some catastrophic situation, responding in and out of season with the withdrawal reflex, barking, biting at the harness or the investigator's hand. The animal's entire adjustment had undergone deterioration and disorganization.

Studies carried on at Cornell University have shown that the animal's behavior, and indeed his physiology, is profoundly altered even in situations outside the laboratory. A sheep subjected to similar training became like a nervous patient, unable to rest at night. Whereas there had been sharp differences in activity level between day and night prior to the training, now the sheep was "dopey" in the daytime, wakeful at night. The creaking of the windmill outside the barn would send its heart into a racing flutter, and each slight sound would induce excessive reactions all through the night. The previously gregarious sheep, always grazing and moving with the herd, now had become an "isolate," avoiding other animals, staying in a separate part of the field.³

The identification of a neurotic type Animals are by no means equally susceptible to the breakdown. Commenting on his dogs, W. T. James noted that some were sluggish and lazy (basset hounds) while others were active, alert, nervous (saluki and German shepherd).⁴ The former make slow responses to a shock on the forepaw, barely lifting their paws when the shock is applied. The latter are disturbed by the shocks, reacting as soon as a warning signal is given, and holding their legs poised in anxious anticipation in the intervals.

Anderson and Parmenter, studying experimental neuroses in sheep and dogs, believe that the German shepherd and saluki, and similar slender, wiry, "nervous" breeds of dog, are more susceptible to experimental neuroses. They found that the Cheviot and Merino breeds of sheep (in contrast with the sluggish Shropshire) were both more active and more susceptible. The "neurotic" breeds of sheep were described as naturally shy, suspicious, individualistic, even before their subjection to neurosis-inducing techniques.

These general impressions do not, of course, afford the accurate statistical measure of susceptibility in successive generations of experimental animals that we need in order to evaluate the inheritance factor.

Susceptibility to audiogenic seizures Martin and Hall studied the behavior of 90 male albinos from the sixth and seventh generations of Hall's strains (using 40 "emotionals" and 50 "non-emotionals"). Using high-frequency auditory stimuli of the type other investigators had found were suitable to produce seizures in these animals, they compared the susceptibility of the two strains.⁵ A hissing air-blast or the sound of jingling keys produces dramatic behavioral changes in some rodents, setting off a "running attack" in which the animal scrambles and bounces about, with little regard for obstacles, for as much as ten seconds. Following this the animal may

freeze in various fixed postures, appearing stuporous. Its limbs and trunk can be molded into various shapes, as though the animal were made of soft wax, the postures persisting as they are left by the experimenter. More severe convulsive seizures appear in other animals. Lying on its side with legs kicking, jaws pounding, or rigidly stepping, tottering, hopping, the animal reminds one of the epileptic.

It is interesting to note that, out of a total of 97 convulsive seizures, only 5 were found in the "emotionals." An analysis of the data indicates that the difference between the two groups depends upon the high degree of susceptibility of a few animals. The selective breeding that isolated the "non-emotional" strain also produced a few individuals (actually five animals) who were highly susceptible to the convulsive attack. If these animals are removed from the computation a comparison of the two strains does not reveal significant differences.

Differences in susceptibility of the gray Norway and the albino rat The wilder, more aggressive, less easily domesticated Norway rat is found to be more susceptible to the audiogenic seizure, and to have more of the severe, convulsive seizures.⁶ Some albinos are as susceptible as the Norways, but the susceptible animals were not found in as high a proportion. Summarizing the experimental findings we may say that: (1) more Norways have attacks (97 per cent against 62 per cent), (2) Norways have more attacks per animal (33 attacks against 17), (3) Norways contain more high-scoring individuals (67 against 22.3),* and (4) Norways have a larger number of severe attacks (8.5 convulsions per Norway vs. 1.1 convulsions per albino).

Inheritance of susceptibility in stable and unstable strains A laboratory strain can be so highly susceptible to audiogenic seizures that even with matings of normals (non-susceptible individuals) with normals for three generations, a majority of the offspring are still susceptible. The table below shows a comparison of results with two strains obtained by Maier. The experimenter found that the susceptible strain was also more apt to show convulsions in response to metrazol (a camphor derivative used in shock-therapy). They were less likely to mate, and their litters contained slightly fewer viable offspring. In the F3 generation produced by mating normals the stable strain contains but 2.7 per cent susceptible animals, the unstable still contains 68.6 per cent.

* A score was computed by dividing the total number of seizures by the total days of trials and multiplying the quotient by 100. A high-scoring individual was selected by locating all animals with an index above 50.

Incidence of Audiogenic Seizures in Two Strains of Rats

Type of crossings for two generations	Unstable strain		Stable strain	
	NUMBER F3 OFFSPRING	PER CENT SUSCEPTIBLE	NUMBER F3 OFFSPRING	PER CENT SUSCEPTIBLE
Susceptible x Susceptible	48	83.3	34	55.9
Normal x Normal	37	68.6	37	2.7

From N. R. F. Maier, "Studies of Abnormal Behavior in the Rat. XIV. Strain Differences in the Inheritance of Susceptibility to Convulsions," *Journal of Comparative Psychology*, 35 (1943), pp. 327-335

Further evidence again suggests that "susceptibility to seizures" is a complex condition arising from the joint action of many factors. Experimental studies have shown that lowering the magnesium content of the diet increases susceptibility⁷ whereas fortifying standard diets with additional vitamins of the B-complex lowers susceptibility.⁸ Thus, on the basis of the limited data here reviewed, we could point to three sets of factors producing breakdowns in experimental animals: (1) genetic-constitutional, inherited susceptibility; (2) dietary-constitutional, acquired susceptibility, and (3) the intensity and chronicity of the external press (jangling keys, air-blasts, discrimination tasks that tax the capacity of the animal).

Inherited Differences in Intellectual Capacity

The problem of classification in the public schools The differences we have discussed so far seem to lie primarily in the field of emotion and temperament. There are also differences between individuals in the intellectual sphere, in their capacity to learn. At least a third of our children in the public schools do not progress at the expected rate, and between 5 and 10 per cent are retarded as much as three years. Carefully standardized tests have shown that the retardation rests upon a defective capacity in many cases, and schools have found it necessary to classify their pupils so that the demands and expectations of the staff may be adjusted to what it is possible for the child to accomplish.

Resemblance in capacity not proof of inheritance There has been a great deal of discussion as to whether this capacity which the classification tests measure is also inherited in the same manner that "emotionality" and susceptibility to mental abnormalities are inherited. When the resemblance

between parents and children is high, some feel that the case for heredity has been proved. Conversely, when children growing up in the same family show widely divergent capacities, it is again claimed that the case for inheritance is proved. Neither resemblance nor divergence, taken alone, is proof. As we shall see, the specific conditions that operate during the long course of human development must be taken into account. The oft-quoted studies of the Jukes, the Nams, and the Kallikaks—not to mention the contrasting Edwards family—are now considered worthless as scientific data. They were carried on prior to the development of adequate psychological measuring instruments, and they afford no means of separating the complex of biological and social factors into component parts. The young Kallikak, growing up in a Kallikak home, with a poor brand of parents, on Kallikak street (usually on the wrong side of the tracks) has such an abnormal milieu that we could not attribute his final Kallikak status to Kallikak genes until we had made some effort to control the environmental factor.

Identical twin studies As in the studies of inheritance of mental disorder, the identical twin studies have proved useful. The correlation figures* indicate that there is a closer resemblance between identical twins, in intelligence test scores, than between fraternal twins, and this is an important theoretical point, for the latter do not resemble one another genetically to any greater degree than siblings in general. That this resemblance should follow the pattern of resemblance in standing height, a structural characteristic we attribute mainly to genetic factors, inclines us to think of the intellectual capacity as also determined by inheritance (see table below).

Further consideration of these figures raises troublesome points for the simple inheritance interpretation. Why should the resemblance for fraternal twins be higher than that for siblings? Is it because they arrive on the family scene at the same time and live through common experiences to a degree that is greater than is the case for siblings in general? Is it because identical twins are always of the same sex and fraternal twins of the same sex in only

* The correlation index that shows a perfect positive relationship is expressed as $+1.00$. If height were perfectly correlated with weight, the relationship would be expressed by this figure, and we could predict either value if the other were known. As it is, the relationship is nearer $+.67$. If there is a perfect inverse relationship, a negative correlation coefficient (-1.00) would be used. A zero value would indicate no relationship whatever. The correlation value representing the resemblance between identical twins in intelligence test rating is .90; for fraternal twins, .70, for siblings, .50, for parent and child, .49. (Positive correlations are customarily written without the plus sign.) Random pairs of children selected from the general population would show a resemblance of pure chance character, and the value in this case is .00.

*Correlation Values Measuring Resemblance in
Standing Height and in Intelligence in Siblings,
Fraternal Twins, and Identical Twins*

RELATIONSHIP	CORRELATION IN STANDING HEIGHT	CORRELATION IN INTELLIGENCE TEST SCORES
Identical Twins	.94	90
Fraternal Twins	.58	70
Siblings	.50	.50

half of the cases that the resemblance is lower than for identicals? Actually, like-sexed fraternal twins show a correlation in intelligence of .82; unlike-sexed fraternal twins a correlation of .59. Do we treat identicals alike to a greater degree than fraternal twins? Do we treat the two sexes in such different ways that the sex-resemblance is a determining factor?

These questions give great importance to the few studies of twins reared apart. When identical twins are separated in early years and given different amounts of schooling, they show marked differences in ability—differences in intelligence quotients ranging from 5 to 25 points. Since the average difference between members of random pairs of unrelated children selected from the general school population is but 15 points, these values are significant. When the identicals are reared together or when, though separated, their opportunities are equal, the resemblance between identicals is very high, the differences in their scores being no greater than is found when two successive tests of the same individual are compared. Fraternal twins reared together show a greater resemblance than identical twins reared apart.⁹

A CASE OF IDENTICAL TWINS REARED APART Mabel and Mary, separated at five months of age, were observed when they were 29 years of age. They had remained apart and were unacquainted up to their twentieth year. On separation they had been taken to relatives in Ohio where they lived on separate farms. At six Mary was taken to town. She never became an active, outdoor girl and after graduating from high school worked in a store, taught piano in the evenings. Mabel did strenuous farm work, liked the outdoor life, and her calloused hands indicated that she was a participating member of a rural household. Mabel was

more robust, heavier, more erect, and walked with an assured, rapid gait that was almost masculine. Mary's complexion was less clear, her posture slightly stooped. She moved slowly and spoke in a reserved and "lady-like" fashion. She was also susceptible to severe colds, in contrast to Mabel who was practically cold-free. Mabel's country schooling had not interested her greatly and she had never read to any extent. Mary had always been in the upper quartile of her group and had been interested in learning.

When these two girls were tested Mary showed a mental age of 17 years (on the Stanford Binet test). Mabel's achievement was comparable to that of the average child of 14. Their quotients (106.2 and 88.5) showed a much greater difference than is usual, greater indeed than the average difference for random pairs of unrelated children.*

There were also marked differences in personality. Mabel was the more stable emotionally. In spite of her poorer test score Mabel impressed the examiners as a more capable person, and if they had relied upon surface impressions they would have said that Mabel was the more intelligent of the two. She talked more freely, seemed to dominate her sister, and to have more "horse sense."¹⁰

Inheritance of learning capacity in the albino rat Experimental animals can be taught to thread their way through a system of maze pathways, avoiding false turns and making a direct approach to the alley at the end of which they always find food. There are marked individual differences in their speed of elimination of errors, however. In the 17-blind maze used by Tryon, some animals made but 10 false turns in a total of 19 trials, while others ran up totals of more than 230. The question arises. Will the progeny of the maze-bright rats be as "intelligent" as their parents?

Figure 4 presents Tryon's data in graphical form.¹¹ The first curve, labelled P, shows the distribution of performance scores in the "parental" generation, an unselected sample of 142 rats. The middle scores (55 to 65

* These quotients represent the ratio between mental age and chronological age of the subject tested. If the performance of a 10-year-old child is neither superior nor inferior to that of the average child of his age, he would achieve a mental age (MA) of 10, and the IQ (intelligence quotient) expressed in percentage terms would be 100. If a 10-year-old child is able to perform as well as the average 12-year-old, he would be given a mental age of 12, and his IQ would then be 120.

$$IQ = \frac{MA}{CA} \times 100$$

Mental test scores improve little beyond the age of 15. In computing IQ's for adults, the CA used in the formula is 16, whatever the actual chronological age at the time of the test.

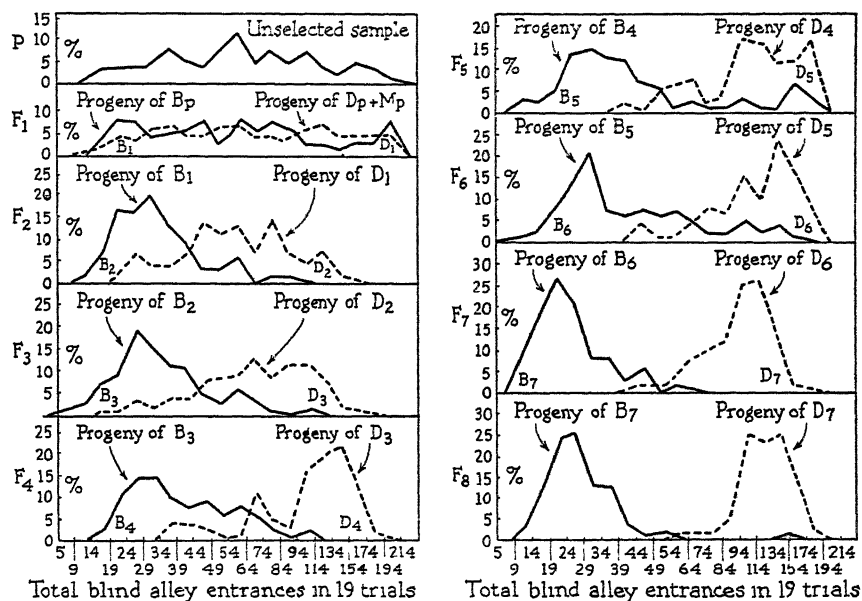


FIGURE 4. Effect of continued selective breeding of "brights" and "dulls" on succeeding generations [From Tryon, p 113 ¹¹]

errors) were the most common scores, and with its single prominent central peak the shape of the curve of distribution of the scores gives no hint of two sharply defined types. Pairs of extremely bright (Bp) rats were mated; and the extremely dull (Dp) were mated with rats of median (Mp) ability. The distribution of the scores of the first-generation offspring (F₁) shows wide dispersion and overlapping. Some of the progeny of the dull parents exceeded the brightest of the offspring of the bright parents. As the succeeding generations were selectively bred, clearcut differences emerged. In the F₈ generation there is little overlap. This difference continued to the F₂₂ generation, when Tryon's studies were terminated. The study shows clearly how little we could depend upon random samplings of resemblance between parents and offspring and how much depends upon the antecedent selective breeding that has occurred prior to any given sampling. Only in the later generations did the correlations emerge.

A later study employed 30 measures of the performance of members of the F₂₂ generation.¹² In nine different test situations Searle compared the Brights and Dulls and scaled their performance against that of a mixed strain produced by crossing the two pure lines in the F₇ generation. Searle wished to know whether the "brightness" of the Bright group would also

show up in other measures of learning. Tests of performance in the open field (Hall), activity cage, water tank, elevated maze, discrimination box, and mazes of three orders of difficulty were made.

The Brights were superior to the Dulls in the food-reward situation, and they showed less fear of doors, curtains, alleys, and unstable sections of floor in the mazes and discrimination tasks. They did not perform as well in the escape-from-water tasks, and they showed more fear of open spaces, more avoidance reactions in being handled, more timidity in the elevated maze situation. The Dulls were rather apathetic about food, slower to begin eating, superior on the water-escape tasks, less emotional in the handling, open field situations. The Dulls were specifically frightened by the unstable platform or section of the floor. The Dulls showed much higher spontaneous activity and, in spite of lower food motivation, as good running time as the Brights.

We arrive at the notion, therefore, of a *pattern* of susceptibilities and capacities. While a single test measures learning ability, it also provides the animal with open or closed spaces, doors, curtains, specific types of rewarding stimuli, specific samples of objects-to-be-avoided. We cannot assume, in advance, that the complex set of differential sensibilities and capacities possessed by a given animal will be closely integrated as a unit. Hence the test that segregates one trait may fail to segregate others.

On the other hand the particular test employed as a test of "brightness" may also reflect fear of water, fear of open spaces, hunger drive, amount of energy available for exploration, and so on. The rating of a particular animal is therefore a complex resultant of many factors, some of which would not be involved in other measures of intelligence or learning capacity. The results indicate that single test ratings form an inadequate basis for estimates of generalized intellectual ability.

Searle concludes:

"No evidence was found that a difference exists between the Brights and Dulls in the learning capacity *per se*. A detailed study of the behavior profiles indicated that Brights are characteristically food-driven, economical of distance, low in motivation to escape from water, and timid in response to open spaces. Dulls are relatively disinterested in food, average or better in water motivation, and timid of mechanical apparatus features. It is concluded that brightness and dullness in the original Tryon Maze may be accounted for in large part by such motivational and emotional patterns. Although indications exist that the two strains may also be differentiated with reference to certain basic "cognitive" tendencies, the procedures fol-

lowed in this experiment were not sufficiently analytical to indicate their nature ”*

It should be remembered that the mechanisms of inheritance of traits of the types we have been considering (intelligence, emotionality, susceptibility to seizures, and the like) are extremely complicated. Since the activities involve the whole animal we would not expect such performance to be closely correlated with the degree of development of any specific structures. When we recall that the geneticist has found it necessary to assume that at least 50 different genes contribute to the eye-color of *Drosophila*, we can see that it is extremely unlikely that any simple genetic explanation will account for the “intelligence” of Tryon’s animals, who use eyes, ears, nose, whiskers, and a complex neural network in adjusting to their new mazes. It appears, however, that by selective breeding an experimenter can segregate combinations of traits that favor specific types of performance and that will breed true to type.

DEVELOPMENT VIEWED AS THE COLLABORATION OF HEREDITY AND ENVIRONMENT

If the environment always supplied a standard, optimum, set of conditions so that growth could attain the limit permitted by genetic constitution, then we could truly say, “Blood (that is, the genes) will tell.” This ideal condition is never more than approximated, however, even in well adjusted creatures, and in some instances the modulations imposed by the environment are such that the animal does not achieve its normal destiny at all. One-eyed fish can be produced by increasing beyond a certain optimum the magnesium content of the water in which the eggs develop¹³. Here the same gene-system is capable of producing two different organisms, depending upon the medium in which development occurs.

There is a species of Chinese primrose that produces two types of flowers. Grown at greenhouse temperatures (55 to 65 degrees Fahrenheit) the flowers are red; at 95 degrees Fahrenheit they are white. The succeeding generations, bred under constant conditions, breed true to form; but the seeds from either flower, bred under the opposite condition of temperature, produce the opposite type.

* Lloyd V. Searle, “The Organization of Hereditary Maze-Brightness and Maze-Dullness,” *Genetic Psychology Monographs*, 39, 2nd half (1949) (Provincetown, Massachusetts: Journal Press), p. 920. Used by permission.

The So-Called Pecking Instinct: A Case Illustrating the Role of Practice

The environment within which an individual develops is also a stimulating, action-invoking milieu. The chick that is forced to exercise its pecking apparatus to secure food, develops an accuracy that increases to an optimum in its first half dozen days of practice (see Figure 5). In Moseley's curves which plot the growth of accuracy it can be seen that when practice is delayed by feeding the chicks in the dark until the eleventh day, the improvement in pecking skill occurs less rapidly.

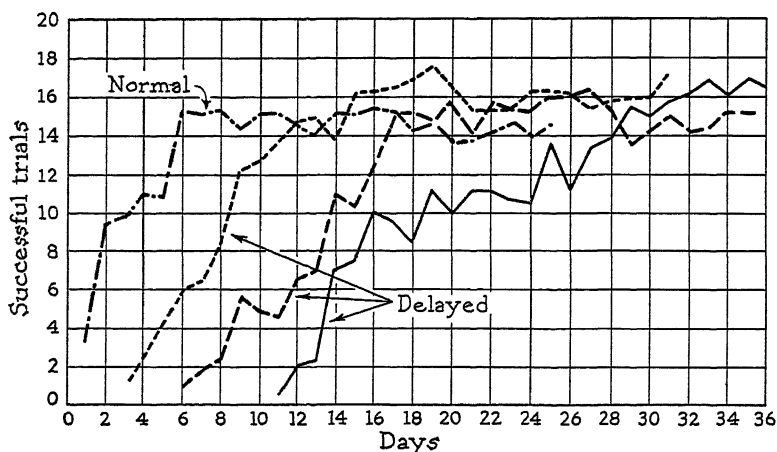


FIGURE 5 Curves for the hit-seize-swallow response in chicks: normal controls and groups delayed 3, 6, and 11 days. Note the slower rate of ascent of the 11-day-delay group. Note that in spite of greater maturity the delayed chicks start at a low level of accuracy. Two weeks of practice are required to bring the 11-day-delay group up to the level of the controls. [From D. Moseley, "The Accuracy of the Pecking Response in Chicks," *Journal of Comparative Psychology*, 15 (1925), p. 90.]

If the chick is permitted but ten trials per day (just enough to measure its progress) and if it is otherwise kept in the dark and fed with a medicine dropper, the well integrated hit-seize-swallow pattern that chicks normally acquire never develops. Chicks do not peck in the dark, and the chicks maturing in the dark remain clumsy until they are brought out into the light and given more extended practice. Although Moseley's chicks had completed eleven days of growth in the dark their beginning scores were as low as those of one-day-old chicks.

If all practice is delayed for as long as two weeks it becomes difficult to

get the chicks to feed in their normal manner Padilla did not give his chicks any light experience at all,* and at the fourteenth day these chicks stood on a surface surrounded by grains, starving in the midst of plenty The "pecking instinct" had ceased to operate The chicks were active enough and used their eyes in jumping over obstacles, but the visual stimulus of the cracked grains did not initiate pecking even when they were hungry to the point of starvation. The experimenter managed to train a few of his chicks to peck, first placing them in a semi-soft milk and mash mixture where any contact with the surface would be "successful," and then gradually transferring them to a grain-covered surface, scattered kernels, and isolated bits of food They improved slowly, never achieving the accuracy of normally reared chicks.¹⁴

The Case of the Queen Bee

The one-eyed fish, the white primroses, the chicks who do not develop pecking skills, all serve to remind us that every gene system is capable of developing into a range of types as diverse environments collaborate in the development process This is dramatically illustrated by the case of the bee Whether a certain egg becomes a queen bee or worker depends upon the food with which the brood cell is stocked. Supplied with "royal jelly" (an enriched diet prepared by the workers of the colony) the egg becomes a queen Bee-keepers are quite aware of this, and some make a business of rearing queens for the market, providing a synthetic royal jelly mixed according to a formula The anatomical differences between worker and queen, which develop as a result of this special food, are striking, and the differences in behavior even more so The queen settles down as a virtual egg-laying machine to repopulate the colony In the height of the season she is capable of laying several times her own weight in eggs per day The workers, undeveloped females, are occupied with a dozen different tasks, including that of "grooming" the queen and keeping her supplied with food and water.

The Developing Organism Assimilates Its Environment

It is proper, therefore, to speak of the organism as assimilating its environment in two senses. It assimilates the chemical environment, building into its own tissues the substances it selects from its milieu And although the range and amounts of substances absorbed depend to some considerable degree upon the internal constitution of the fertilized egg-cell, we can see in the case of the queen bee and the worker how different destinies can come out of the same genetic materials when the substances supplied by the

* Moseley had given her chicks some light experience at feeding time Padilla fed his chicks in the dark.

milieu differ in kind and quantity. In this case the phrase "we are what we eat" has a striking truth.

In the second sense, the organism assimilates the environment by developing a set of expectancies for objects arranged in space and time, a set of "needs" for familiar rewards, a set of fears for terrifying and punishing objects. The physical environment, internalized as expectancies, is transformed into a shaped field, a *behavior environment*. As a result of this commerce between organism and environment the physical milieu takes on meanings, and concurrently the animal's behavior develops patterns, rhythms. Action cycles with a beginning and end appear, new integrations and discriminations emerge. The determining conditions that regulate the final outcome (for example, skillful behavior) are both external and internal. They reside as much in the assimilated environment as in the gene-system itself. Without the genetic system the patterns would not eventuate; without the particular spatio-temporal distribution of objects, the precise patterns of anticipation that emerge would not have taken shape. Destiny, the goal of development, lies neither in the genes nor in the environment but in the unique patterns of commerce between the two.

Rodent-killing behavior in kittens This type of interaction is beautifully illustrated by the studies of Kuo.¹⁵ Pursuing a problem that had been raised by earlier investigators—as to whether mouse-catching in kittens was instinctive or not—Kuo introduced some interesting controls. Some of his kittens were permitted to grow up with a mouse or rat for cage-companion, whereas others grew up with mothers who were themselves "killers." The latter kittens saw their mother make a kill outside their cage, once every four days. The kittens, tested once every four days until the fourth month, showed the effects of their training. 18 out of 21 of the kittens reared with a killer-mother also killed rodents; 3 out of 18 reared with rodent litter-mates killed rodents (but not the litter-mate). Still a third type of cat-behavior was produced by a technique that introduced a shock every time a mouse appeared. Thus a single set of genes is capable of becoming a fearful, playful, or aggressive adult cat, depending upon the quality and timing of the environmental collaboration.

Early environment creates later demands The early environment that is assimilated in the early stages of development creates more than the mere tendency to respond when appropriate stimuli appear. It creates needs, demands. Kuo's kittens, reared with a rodent-companion, grew restless, mewled, and showed their lonesomeness and discomfort when their rodent

companions were taken away. When the rat was returned, the kitten quieted down. So it is that human adults long for the mountains (or the open spaces), the climate, the home-cooking, the "good life" that shaped their youth, whether it is of Colvin Hollow or Park Avenue. We recognize, too, that these early years can cultivate a hatred for and "demand against" conditions and objects that frustrated the needs prevailing at that time; and in this recognition we are forced to note that the organism itself has something to say about what is "built in."

SPECIAL CASES ILLUSTRATING THE POTENCY AND COMPLEXITY OF THESE CONTROLS IN HUMAN DEVELOPMENT

This process of collaboration between the intrinsic and extrinsic factors is very difficult to show in the case of human beings, for we cannot achieve, experimentally, the drastic alterations of the environment, the degrees of deprivation, the rigid controls of mating, and the like, used in animal studies. Occasionally there have been records of cases that approach our needs; but in nearly every instance some crucial fact is missing.

There is the case of Kasper Hauser, for example. Described as a royal pretender who had been placed in solitary confinement by ambitious persons, Kasper was released at the age of 17. His cell had not permitted him to stand upright, and he had seen no one but his jailer. When released he could scarcely walk upright. He could speak but one sentence, and he lacked the common manual skills. In spite of serious attempts to train him he progressed slowly (like the delayed chicks). However, since there are no accurate observations of Hauser prior to confinement, and since the whole period of confinement itself is shrouded in mystery, and since we do not know whether he was a congenital defective (or precocious) as an infant, we can scarcely draw any conclusions.

THE CASE OF ANNA The much more recent case of Anna is similarly deficient in many points. The child, a girl of more than five years, was discovered wedged into an old chair in a second-floor storage room of a Pennsylvania farmhouse. She could neither stand, walk, nor speak; and she had no sphincter control. The officer who found her described her as "just bones, with skin drawn over them."¹⁶ The child (illegitimate) had been hidden away by the mother, who still lived at home with the child's grandfather (who could not stand the sight of the child). Records

showed that the child had been born on March 6, 1932, in a nursing home. She had been described by those who had seen her as normal. From this nursing home the child was moved to a children's home, thence to a private home where she was boarded, thence to the mother's home. In the period of her confinement in the upstairs room her diet consisted mainly of milk and a thin oatmeal gruel. She was not bathed or supervised or given toilet-training. Confined in a chair or crib she grew weaker. Even at five she had not been given solids. Fed by spoon, she remained as helpless as one of Padilla's chicks.

When Anna was taken to a county home for care and observation, she lay quite limp and immobile, with expressionless face. The flaccid muscles of her legs and ankles permitted her feet to lie in a straight line with soles touching the bed surface. The examiner thought that she was deaf, and possibly blind, because of her almost complete lack of responsiveness; but there was no evidence of disease and the diagnosis that was finally given was "simple malnutrition." Within three days the child became active and could sit erect if so placed. Hands, head, eyes, arms, and mouth began to move. With a high vitamin diet and daily massage, and more attention than she had hitherto received, she grew responsive, turning to a ticking clock, looking up when the door opened, bouncing on the bed, frowning, scowling. She paid little attention to voices. Although she enjoyed her food she could not chew or drink properly. Toys brought forth a "distracted handling." She showed temper when restrained, and smiled when coaxed.

Although she improved in the home, her mental growth was so sluggish that the physician now felt that she was congenitally deficient. Five months after she had been found her accomplishments, rated against a standardized performance scale for normal infants, indicated that she was as far advanced as the normal child of one year (although she was now six). Within a six month period she began to walk with support, and within thirteen months she could walk alone. At that time she could respond to spoken commands, and she showed an eager interest in the social worker who came to take her for a weekly ride to visit the physician. She could eat with a spoon, but still could speak no word. There was no bladder or bowel control. She had little curiosity, and less initiative. A year and half after her discovery she was placed in a school for defectives, and at this time the observers reported that she could "almost run."

Davis, who studied the case, concludes that the facts indicate the socialization and training of a child must be undertaken at early stages of develop-

ment when the organism is plastic His view of the matter correlates well with such observations of experimental animals as we have reported above; but the meager information about her development before she was discovered in February, 1938, makes any certain interpretation of the data difficult.

A footnote to the case of Anna Anna died of hemorrhagic jaundice in 1942, at the age of ten and one-half years She was rated, at that time, as possessing a mental age of two and one-half years She could follow directions, string beads, identify a few colors, build with blocks, choose attractive pictures She displayed some sense of rhythm, a normal interest in her doll, repeated words and phrases and attempted to carry on a conversation She had learned to be clean about her clothing, to brush her teeth, to help other children Her walking was normal; but she remained clumsy at running Somewhat excitable, she was described as possessing a "pleasant disposition" The examiners concluded that she could be expected to follow the course of development of the average feeble-minded child In their opinion the feeble-mindedness was probably congenital ¹⁷

Supporting this last interpretation were the facts obtained from the case history of the mother The latter was given an IQ rating of 50, and the school records indicated that the mother had been retarded in school work In interview the mother had said that she had always wanted to go on to college; and she was quite ready to blame her failure to do so upon the grandfather The latter was described by his daughter as "penurious, hard-driving" and as quite out of sympathy with his daughter's aims.

It is possible that Anna's case shows the result of a combination of defective inheritance and extreme social isolation The data, as reported, give us too slender a clue to determine the relative contributions of the two factors.

ISABELLE. A SECOND CASE OF ISOLATION There are degrees of isolation Close contact with one human being is enough to provide the groundwork for normal socialization, even when that one person is a deaf-mute and the ordinary skills of audible speech are not developed. These assertions seem to fit the evidence reported by Mason ¹⁸

Discovered at the age of six and one-half, Isabelle responded to and employed gestures but had not developed ordinary speech. She had developed in seclusion, her only contact being with a mother who was a deaf-mute. Rachitic, she stood with legs so bowed that the soles of her

shoes almost came together * She behaved toward strangers like a frightened, wild animal A weird, croaking noise was her nearest approximation to a speech sound

Believed, at first, to be feeble-minded, and behaving so much like a deaf child as to arouse the suspicion of deafness, there did not seem to be much hope for normal intellectual growth Mentally she seemed to have developed to the level of a two-and-a-half-year-old.

Through systematic training, however, she was brought rapidly through the characteristic levels of development Within nine months she was identifying words and sentences on the printed page, writing, retelling a story after hearing it In another seven months she had a vocabulary of 1500-2000 words and performed at a level that was normal for her chronological age In two years she had covered the span of development normally requiring six years At 14 she had completed the sixth grade and participated in all the activities of the classroom

In the present case the "delay" in training in speech did not prevent normal growth Indeed the rate of growth was accelerated.

THE APE AND THE CHILD A third illustration indicates what happens to a young chimpanzee placed in a human environment The Kelloggs adopted a young female chimpanzee, seven and one-half months of age, and gave her the same care that their own child, Donald, received For nine months the two were studied, measured, tested ¹⁹

The outstanding difference was in their rates of growth and development Physically, intellectually, socially, the animal grew at a more rapid rate during these months When Gua first arrived she could walk when led by the hand, and when her mealtime came the chimpanzee could climb into her high-chair unassisted. Climbing ladders, jumping from the furniture, walking gingerly across a floor strewn with wire, catching a fly, were some of the things in which the young chimpanzee surpassed the human child Even more surprising were the more definitely intellectual feats. She responded to words, solved a type of puzzle-box problem, used a hoe-like tool to secure food placed out of reach, learned to delay her responses, localized sound sources—all in a manner superior to the child in the first months of observation

Even in traits that seem especially human Gua took the lead Learning to feed herself with a spoon, achieving bladder and bowel control (even to the extent of "telling" her foster-parents with a clearly understandable

¹⁹ Rachitis, or rickets, is a nutritional disease of childhood which yields to appropriate treatment with sunlight and vitamin D Softening and deformation of the bones are outstanding symptoms

"ooh-ooh" and tell-tale gesture) were some of Gua's accomplishments before Donald had arrived at these stages of socialization

But there were also strict limits to the ape's development. None is more dramatic than the total failure to achieve speech production. Emotional cries there were: a food-bark, the "ooh-ooh" which was a sign of distress in general, a shrill screech or scream of fear, and an aggressive guttural grunt of anger. In spite of patient efforts Kellogg could not teach the young chimpanzee to say "papa." The dramatic gestures of the animal, her quick comprehension of social situations, her understanding of verbal commands, her emotional responsiveness, indicate that the reason for her failure must lie in the total lack of the integrating mechanisms. The sensory structures were there. Lips and tongue were unusually motile; Gua regularly resorted to her lips rather than to pincer movements of thumb and finger when she wanted to pick up some small object. Our thoughts turn to those central nervous system connections in the human brain whose injury produces profound loss of the speech function (aphasia) and which are relatively undeveloped in the ape.

In spite of her speed of maturing, and the great amount of adaptability, the young ape's development could not rise above a definite "ceiling" set by genetic factors. Before the experiment was over the child was surpassing the ape in the social, verbal, intellectual spheres (if not in some sensory and some motor areas).

To a degree Gua was "humanized." We see her rolling a ball back and forth with Donald, drawing on the frosted window-pane, shuffling her shoes across a freshly limed tennis court, playing the game of "pick-it-up" (by throwing objects on the floor from her high-chair, waiting for adults to retrieve them), comforting Donald in his distress. Her early walking, in an upright fashion, also represented an adaptation to a human tutor and not the simple maturation of nerve and muscle; for the pattern is not natural to the chimpanzee.

OBESITY IN CHILDHOOD A fourth instance, illustrating the interplay of factors affecting development, is afforded by Hilde Bruch's studies of overweight children.²⁰ Fifty-nine per cent of her cases (160) showed overweight in excess of 40 per cent when compared with the height-weight norms. In the majority of her cases Bruch found no evidence of endocrine dysfunction. Some who had been treated with endocrine products had not responded. At least 80 per cent of the parents realized that the food intake was larger than average, and when they cut down on this intake the weight of the children could be brought within normal limits.

It was not always easy to secure this cooperation. In some instances the difficulty seemed to depend upon a half-conscious feeling of guilt (half of the children were unwanted). In other cases this seemed to depend upon a desire to make up for things the parents had been denied in their childhood. One Polish mother who had known a great deal of poverty and hunger in her own childhood could not bring herself to deny the child.

As a group the children tended to be inactive, socially and emotionally immature, in spite of a general acceleration in physical maturation. They relied upon their mothers for simple physical care. Their mothers took them to school, mashed their food, kept check on their bowel movements, and seemed to be afraid to allow the children out of their sight. In some cases the onset of overeating could be traced to the birth of a sibling, family financial difficulties, operations, or other tension-inducing causes. These threats to the child's security were reacted to by an increase in appetite, a gain in weight. It was as though receiving food from the mother served as an expression of love and affection, somehow compensating for the anxieties and frustrations.

The factors that affect the physical growth of an obese child affect his whole style of life, altering his personality, and these results in turn affect his physical growth. The obese children showed a lower energy output, reading, listening to the radio, going to the movies, instead of actively participating in group activities, games. As a result they did not develop the skills that would have made them sought-after members of the baseball nine. Obese, sluggish, the child is not chosen, and since he does not participate his skill does not develop. Rejected by the group he begins to feel that he is not wanted; his security-system is threatened. Among the substitutes, eating affords a comfort and satisfaction. His mother worries about the dangers confronting him on the playground, and her solicitude helps to keep him at her side, dependent. His immaturity does make him the butt of jokes; and this, in turn, makes the mother wish to protect him the more. At the same time she begins to wonder if her boy is quite normal, quite as aggressive as members of his sex should be. If she expresses this (as one mother did who insisted that Dr. Bruch give her child sex-gland treatments) the child's sense of inadequacy is further enhanced. And so an interlocking system is set up.

In this instance we see the homeostatic mechanisms functioning in an abnormal fashion. The young eater seems to be trying to satisfy an emotional need with proteins, fats, carbohydrates. He eats to the point where his health is threatened and where his personal development is definitely

damaged; and the cues that would normally arise from satiety do not check his appetite. What he really needs, he does not clearly know. Questioned by his physician he stoutly maintains that he eats very little indeed. (One child, whose family asserted that he was living upon the 1000 calorie diet prescribed by the physician, gained 30 pounds in 8 months. In the hospital, under controlled conditions, the same child lost 15 pounds in 3½ weeks.) Such a child's eating is compulsive, as much a "forced movement" as the light orientation of Loeb's caterpillars. Another child came to the clinic because he could no longer bend over and tie his shoes. An Italian boy of 11 years, he was maintaining a weight of 225 pounds through the cooperation of his schoolmates, whom he had trained to bring something for him in their lunch boxes. He consumed two loaves of bread a day, a pound of spaghetti at one meal, and he supplemented his lunch at school with a dozen or more sandwiches from the other children's boxes. In 2½ years he had doubled his weight.

SUMMARY

The evidence we have reviewed, both clinical and experimental, supports the notion that there are marked inherited differences between human beings, even as there are differences between species. These differences are demonstrable in the intellectual, emotional, physiological, as well as the structural-anatomical aspects of human growth and development. But the studies also indicate that the matrix affects each one of these dimensions. One-eyed fish, obese children, intelligence test scores of fraternal twins, schizophrenia in monozygotic twins—all testify to the range and the degree of effects that are subject to external conditions.

Our next chapter will consider more specifically the manner in which these factors interact in regulating the development of the individual.

REFERENCES

1. C. S. Hall and S. J. Klein, "Individual Differences in Aggressiveness in Rats," *Journal of Comparative Psychology*, 33 (1942), pp. 371-383.
2. E. E. Anderson, "The Interrelationship of Drives in the Male Albino Rat. II. Intercorrelations between 47 Measures of Drives and of Learning," *Comparative Psychology Monograph*, 14, No. 1 (1938), p. 119.

- 3 O D Anderson, Richard Parmenter, and H S Liddell, "Some Cardiovascular Manifestations of the Experimental Neurosis in Sheep," *Psychosomatic Medicine*, 1 (1939), pp 93-100.
- 4 C R Stockard, O D Anderson, and W T James, "The Genetic and Endocrine Basis for Differences in Form and Behavior," *American Anatomical Memoir No 19* (Wistar Institute Press, 1941).
5. Richard F Martin and Calvin S Hall, "Emotional Behavior in the Rat V. The Incidence of Behavior Derangements Resulting from Air-blast Stimulation in Emotional and Non-emotional Strains of Rats," *Journal of Comparative Psychology*, 32 (1941), pp 191-204.
- 6 Edmond J Farris and Eleanor H. Yeakel, "The Susceptibility of Albino and Gray Norway Rats to Audiogenic Seizures," *Journal of Comparative Psychology*, 35 (1943) pp 73-80
- 7 A D Lazovik and R A Patton, "The Relative Effectiveness of Auditory Stimulation and Motivational Stress in Precipitating Convulsions Associated with Magnesium Deficiency," *Journal of Comparative and Physiological Psychology*, 40 (1947), pp. 191-202
- 8 R. A. Patton, "Vitamin B-complex Concentrates and the Incidence of Sound-induced Seizures in Young Albino Rats Maintained on Purified Diets," *Journal of Comparative and Physiological Psychology*, 40 (1947), pp. 323-332
- 9 H. H. Newman, F N Freeman, and K. J Holzinger, *Twins A Study of Heredity and Environment* (University of Chicago Press, 1937)
- 10 H H. Newman, "Mental and Physical Traits of Identical Twins Reared Apart," *Journal of Heredity*, 23 (1932), pp. 2-18
- 11 R C. Tryon, "Genetic Differences in Maze-learning in Rats," in *Thirty-ninth Yearbook of the National Society for the Study of Education*, Part I (1940), pp. 111-119
- 12 Lloyd V Searle, "The Organization of Hereditary Maze-Brightness and Maze-Dullness," *Genetic Psychology Monographs*, 39, second half, 1949.
- 13 C R. Stockard, 'The Development of Artificially Produced Fish—"The Magnesium Embryo,"' *Journal of Experimental Zoology*, 6 (1909), pp 285-338
- 14 Sinforoso G Padilla, "Further Studies on the Delayed Pecking of Chicks," *Journal of Comparative Psychology*, 20 (1935) pp 412-443.
- 15 Z Y Kuo, "The Genesis of the Cat's Response to the Rat," *Journal of Comparative Psychology*, 11 (1930), pp 1-35
- 16 Kingsley Davis, "Extreme Social Isolation of a Child," *American Journal of Sociology*, 45 (1940), pp 554-565
- 17 Davis, "Final Note on a Case of Extreme Isolation," *American Journal of Sociology*, 52 (1947), pp. 432-437
- 18 M. Mason, "Learning to Speak after Six and One-half Years of Silence," *Journal of Speech Disorders*, 7 (1942), pp 295-304.
- 19 W N Kellogg and L A Kellogg, *The Ape and the Child* (McGraw-Hill Book Company, Inc , 1933)
- 20 Hilde Bruch, "Studies of Obesity in Childhood I Physical Growth and Development of Obese Children," *American Journal of Diseases of Children*, 58, (1939), p 457.
——, "III Physiologic and Psychologic Aspects of the Food Intake of Obese Children," *American Journal of Diseases of Children*, 59 (1940), pp 739-781
——, "Obesity in Childhood and Personality Development," *American Journal of Orthopsychiatry*, 11 (1941), pp 407-474
——, and Grace Touraine, "V The Family Frame of Obese Children," *Psychosomatic Medicine*, 2 (1940), pp 140-206.

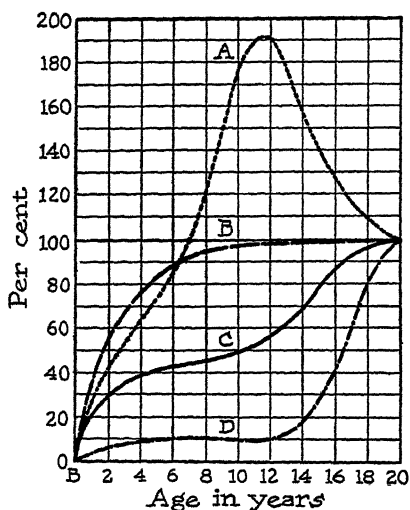
CHAPTER 5

The Maturing of the Individual

From birth to death two processes are continuously intermingled. On the one hand there is the *growth* from a tiny fertilized cell to the fully developed organism with its differentiated parts; and on the other hand there is the continuous process of readjustment between the organism and its milieu that we call *learning*. The one process produces an organism with its hundreds of trillions of differentiated cells integrated into a functional whole, operating according to homeostatic laws. The other process adjusts and readjusts the developing organism to the physical and social matrix around it until a fully developed personality emerges. The process of maturing is further complicated by the fact that even before adulthood is achieved the decay of tissues begins. Such an arrest and recession in the thymus gland can be seen in Scammon's figure (Figure 6). When, with the onset of old age, the fires of life die down and the stream of energy flows sluggishly, the changes in the tissues set the pace for involutional changes in behavior.

THE STAGES OF DEVELOPMENT: AN OVER-ALL PICTURE

We shall want to know precisely how this maturing and decay of structures affect behavior at each stage, and in attempting to understand the process we shall have to evaluate both the genetic factors and the contributions from the external milieu (both personal and impersonal). The studies cited in



A. Lymphoid type Thymus, lymph nodes, intestinal lymphoid masses

B Neural type Brain and its parts, dura, spinal cord, optic apparatus, many head dimensions.

C. General type Body as a whole, external dimensions (with exception of head and neck), respiratory and digestive organs, kidneys, aorta and pulmonary trunks, spleen, musculature as a whole, skeleton as a whole, blood volume

D Genital type: Testis, ovary, epididymis, uterine tube, prostate, prostatic urethra, seminal vesicles.

FIGURE 6 Rates of growth (postnatal) in various organ systems Using the status at age 20 as 100 per cent, values for each system are computed in terms of percentage of this terminal status. [From J. A. Harris, C. M. Jackson, D. G. Paterson, and R. E. Scammon, *The Measurement of Man* (University of Minnesota Press, 1930), p. 193.]

Chapter 4 serve to remind us of the importance of keeping both factors in mind.

As development progresses the organization of behavior undergoes qualitative changes. The organism reacts to its environment in new ways, and as it reacts its nature is transformed. The helpless and dependent infant becomes a self-reliant adult, passivity is transformed to expectant purposiveness, and the impulsive child who reacts to the stimulus-of-the-moment comes to inhibit and delay his responses and to act in the light of a survey of a wider environment. From a "mewling and puking" infant he becomes, as one stage follows another, the schoolboy "creeping like a snail unwillingly to school," the "lover, sighing like a furnace," the bearded soldier, the round-bellied justice, the slippered sage, the childish dodderer. An anthropologist, reading these phrases of Shakespeare, might comment that the passage must refer to an age-graded society in which different duties, responsibilities, roles, statuses are assigned to the individual at each age and stage of maturation. A biologist, looking at the same passage, might point out that the role assigned to each stage is in some degree congenial to it. He might even insist that the transition to each new stage is forced or delayed by the pace of intrinsically regulated changes occurring within the individual. The helplessness of infancy is dictated by an immature and incompletely

formed reflex system; the role of "the lover sighing like a furnace" is timed at that stage when the secretion of the reproductive hormones rises to a peak, the childishness of old age is timed by the decay of powers, the loss of vital energies, the changes in bodily chemistry, and sometimes by an atrophy of nervous tissue. Grandfather, who can't remember where he placed his spectacles, may be suffering from chromatolysis of the cells of the frontal lobes.

Chapters 3 and 4 have prepared us for a view that will give due weight to both interpretations. The study of human growth and development in the four societies certainly suggested that out of common human materials divergent types of men can be molded—aggressive Kwakiutl, cooperative Zuñi, apathetic mountain white, placid Samoan. On the other hand our study of capacities and susceptibilities has verified the existence of intrinsic factors which must result in a differential outcome of the impact of the same society upon the qualitatively different individuals within it.

The unravelling of the interplay of these two factors as they operate in the maturing individual provides the psychologist with one of his most difficult and pressing assignments. The assignment is difficult because, as has been pointed out, it is difficult to achieve adequate experimental controls in the case of human beings. It is pressing because at this moment in the twentieth century there are many men who appear to have adopted doctrines that already assume an answer to the basic questions. If they were to have their way these questions would soon cease to receive any dispassionate consideration. The concept of a master race, for example, assumes that certain desirable goals of human development (for example, courage, intelligence, character) are so predetermined by the genetic traits of particular races or classes that it would be folly to hold out hope to other races for anything but a subordinate status. The blood (or the genes) of these masters, if kept pure, would guarantee their right to rule.

Although Hitler's rantings seemed absurd to most Americans, the virus of the superiority myth has long been at work among us. The writings of the founding fathers reveal the presence of this taint. The doctrine of white supremacy assumes that the myth is truth. There is also an upper class psychology which rests upon a similar faith in the better blood of certain families. That these myths are held by persons in influential positions and that contrary evidence can be met with resentment and suppressive measures, even in twentieth-century America, is demonstrated by the fate of a pamphlet barred from sale in military canteens during World War II. Purporting to show that the black and white races of mankind do not differ in their basic capabilities, it was deemed communistic, subversive, unfit for the consumption of troops.

fighting for democracy, and was ordered barred from sale in military canteens by the House Military Affairs Committee ¹

If desirable human goals can be attained only by those classes and races whose genetic constitutions guarantee such superior performances, then the problem of human engineering will consist in the measurement and selection of the fit, the control of human matings, and in the systematic and planned education of the less fit for subordinate roles. If the extrinsic factors are the principal regulators, then human intelligence can use these external factors so that what is now a superior development of a few will become the normal, the average. Far from being a set of academic exercises or a romantic and utopian sort of speculation, the questions we now raise touch matters of vital concern for us, and for our children. The answers may not guarantee any egalitarian utopia, but they are vitally related to what it is possible for man to hope for.

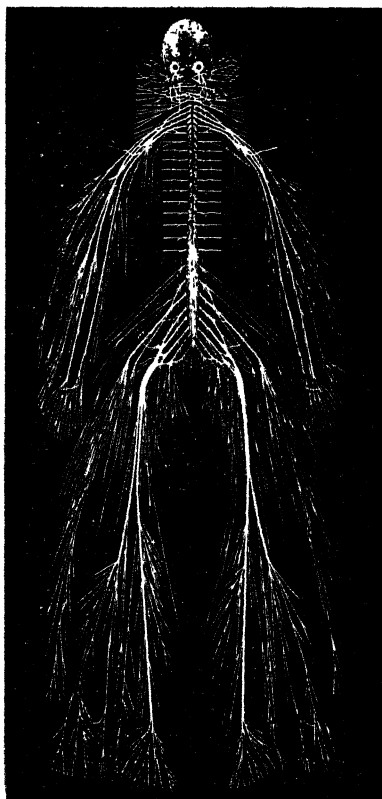
THE BEGINNING OF DEVELOPMENT

Life begins with the fertilized ovum, a tiny dot of protoplasm (175 thousandths of a millimeter in diameter). Division of this cell and its offspring is repeated through some 45 generations until at the end of the nine months of pregnancy the full-term fetus, weighing 6½ to 8 pounds and measuring in the neighborhood of 50 centimeters from head to heel, is ready for birth. The single cell, containing 24 pairs of chromosomes in its nucleus, carries the complement of determiners supplied by two parental lines, and from this single cell, as cell-division and differentiation create the fetus, there arise the hundreds of types of cells and tissues that make up the body's organs. Bones, hair, teeth, blood cells, muscles, sense organs, glands, connective tissue, and the billions of nerve cells that integrate these parts, are all offspring of that cell. Such traits as blue eyes, early maturity, emotionality, instability, length of life, stupidity, baldness, sensory acuity, body-type, length of fingers, and all the thousands of dimensions and proportions that characterize the developed organism, must find their genetic roots within this fertilized cell.

Development of the Fetus

Neural maturation As the cells in the developing human embryo divide, differentiate, and migrate to their final positions, nerve cells (neurons) grow out from a central neural tube until they form an integrating network

FIGURE 7. The larger nerves of the body Reproduced from a photograph showing a dissection of the major peripheral nerves [From a photograph by Dr. F. W. Weaver, in Warren and Carmichael, *Elements of Human Psychology* (Houghton Mifflin Company), p. 24 a By permission of the publishers]



The neural tube, from which the network springs, is formed from the in-folded outer layer of the embryo and extends from the base of the spine to the head. From cell bodies located along this central tube, long fibrous processes grow out to the most remote parts of the body. Figure 7 shows the completed network formed by the main nerves. Figure 8 shows stages in the formation of the neural tube.

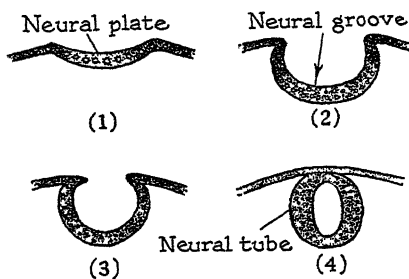


FIGURE 8. Schematic drawing showing the closing of the neural groove. [Based on a drawing in H. E. Jordan and J. E. Kindred, *A Textbook of Embryology* (D. Appleton and Co., Inc.).]

The significance of this neural growth may be grasped if we return, for a moment, to the figure of our schematic animal (see Figure 9) In A, which represents an early stage of development, there are sensory cells, E_1 , and E_2 , and muscle cells, M_1 , and M_2 , but these cells are not connected. If, at this stage of growth (corresponding to the earliest stages of the embryo), light should strike the eyespot, it would produce merely a local breakdown of light-sensitive chemicals. No orientation to the light would be forced upon the organism since the connectors, C_1 and C_2 , are not in contact either with the sensory or motor cells. As soon as the organism reaches the stage of development shown in B, Figure 9, and the nerve fibers have completed their growth, the orientation movement will occur.

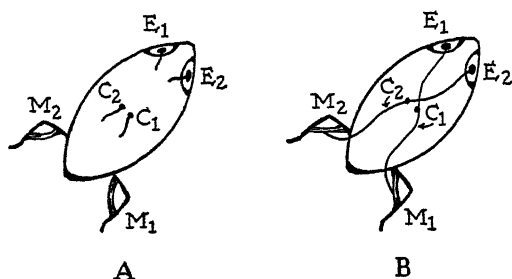


FIGURE 9. Schematic animal, showing early and late stages in development.

The emergence of fetal behavior This simple schematic account helps us to understand what occurs in the development of the human fetus. By the fifth month the spontaneous movements of the fetus have attained such force that the mother is made aware of their presence. The kicking of the fetal foot is palpable through the abdominal wall. The heart has been beating since the third week, when the embryo was less than a millimeter and a half in length. But at this stage the heartbeat is neither initiated nor regulated by any stimuli that act upon the heart and reach it from the central nervous tissues; for these regulating fibers have not yet grown out from the cells in the neural groove. By the eighth to the tenth weeks diffuse movements of neck, trunk, and extremities *in response to stimuli* applied to the neck region begin to appear. Occasional local movements of arms and legs appear at this time, but it is not until the twenty-fourth week that strong and precise movements of grasping are present.

A few of the fetal movements that have been observed under carefully controlled conditions are listed on page 107, together with their date of maturation and the type of stimulation that calls them forth.

*Age at Which Fetal Movements Appear,
and Stimuli That Evoke Them*

AGE (IN WEEKS)	OBSERVED RESPONSES	TYPE OF STIMULATION
2-3	Heartbeat	
9-10	Bending and rotating of body and rump, movements of arms and head	Tactual stimulus to the neck region
11-12	Knee jerk	Light blow to patellar tendon
21-24	Grasping movements (weak)	Tactual stimulus to the palm
	Sucking reflex	Tactual stimulus to mouth, tongue
	Eyelid closure	Tactual stimulus to conjunctiva
	Leg flexion, extension of opposite leg and move- ment of opposite hand	Tactual stimulus to one foot
32-	Pupil contracts	Light stimulus to eye
birth	Strong grasp	Stimulus to palm

Adapted from Norman L. Munn, *Psychological Development* (Houghton Mifflin Company, 1938). The original sources are as follows:

D. Hooker, "Early Fetal Activity in Mammals," *Yale Journal of Biology and Medicine*, 8 (1936), pp. 579-602.

M. Minkowski, "Reflexes et Mouvements de la Tête, du Tronc, et des Extrémités, du Foetus Humain pendant la Première Moitié de la Grossesse," *Comptes Rendus des Séances de la Société de Biologie*, 83, 1 (1920).

At the twenty-second week, when the first weak grasping movements come through, the fetus is about 26 centimeters long. From the neural groove to the palm of the hand is a distance of approximately 13 centimeters. Cells lying in the neural groove have sent two lines of communication to the forearm and palm prior to this time. One to pick up the sensory stimulation and relay it to a second cell whose cell body lies in the gray matter of the spinal cord, the other carrying impulses outward to the forearm muscles which close the fingers over the palm. Like tap roots penetrating the soil these growing fibers have penetrated the tissues connecting finally with the cells they serve.

The diagram of a reflex arc, shown in Figure 10, is a highly simplified drawing of such a completed set of connections. The minimum operating network consists of an afferent (sensory) fiber which picks up the stimulus

(for example, the tactual stimulus to the palm) and relays it to the central cell (located in the lower, or front, portion of the central butterfly-shaped mass of gray matter in the spinal cord) This sensory fiber is the outgrowth of the cell body in the spinal ganglion lying between the cord and the skin surface in the figure In an earlier embryonic stage this cell was also a part of the outer (ectodermal) layer of the embryo, and in the course of the folding-in process it was left just outside and in back of the spinal cord

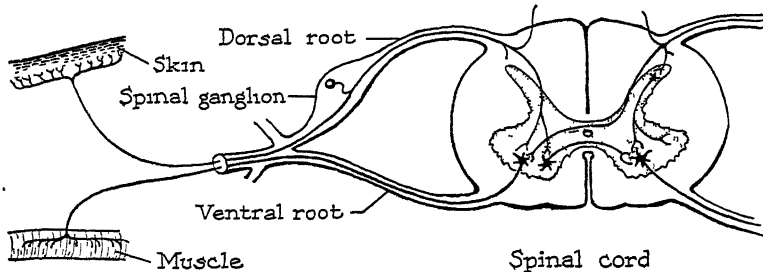


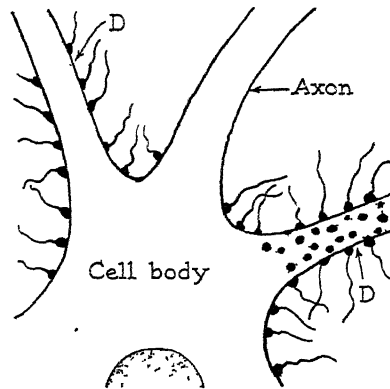
FIGURE 10 Diagrammatic section of spinal cord and spinal nerves. A stimulus applied to the skin surface produces changes, in the sensory nerve, which travel centralward, entering the spinal cord at the back. The impulse entering the cord passes into the central mass of gray and there arouses a motor cell of the same side, a fiber which crosses the cord within the gray matter to arouse a motor cell of the opposite side [Based on S. W. Ransom, *Anatomy of the Nervous System* (W. B. Saunders Company, 1935) 5th ed., p. 53]

proper This second cell sent one of its processes outward to the sensory surface and one into the cord. The other cell is called a motor neuron, and as it grew its long axon penetrated muscle tissue (for example, the muscles of the forearm that close the fingers in a grasping movement). This cell is also called an efferent fiber and always carries impulses away from the cord. The point of junction between sensory and motor fibers is called the synapse. The entire act, whose mechanism is here schematized, had to wait for the growth of these fibers. Once the growth is completed, the neural impulse aroused by the touch stimulus travels to the spinal cord and back to the muscles in less than a tenth of a second.

In the living organism there are hundreds of such fibers activated in the simplest reflexes. Gangs of hundreds of thousands of cells are involved in the simple eyelid closure that follows the flash of a bright light. The schematic diagram is a gross simplification. The cell within the central mass of gray matter of the spinal cord actually receives incoming impulses from hundreds of sensory fibers, and from some cells whose fibers begin and end entirely

within the spinal cord. These latter relay cells carry impulses arising at levels above and below the level at which the cross-section (shown in the figure) is taken. Figure 11 shows an enlargement of a motor cell from the ventral gray of a rabbit's spinal cord. The dozens of terminal endings, which resemble small pollywogs feeding, are the highly magnified endings of as many sensory (or connecting) cells. The action of the motor cell is seen to be aroused by many diverse sources of stimulation. Some of these sources lie within the organism itself (for example, the contracting stomach walls). There is thus a mechanism for the distribution of every impulse throughout the whole network, and for the convergence of the most diverse sources of stimulation upon a single common pathway out to the muscle.

FIGURE 11. Schematic drawing of a portion of motor cell in a rabbit's spinal cord, showing a few of the hundreds of synaptic terminals upon the cell body and its dendrites (D).



The general character of prenatal development The first responses to stimulation are diffuse movements of the body as a whole. They are highly variable, sluggish. Though they vary from moment to moment this variation is not precisely correlated with changes in the position and nature of the stimulus. As the connecting fibers mature the movements grow more precise. Local reactions to weak stimuli begin to appear; the pupil reacts to light, the stimulated leg retracts while the opposite leg is extended. Mass reflexes are replaced by localizing patterns.

These earliest changes in the patterns of behavior are the outcome of growth. No education of the fetus is required. Nor does the surrounding culture affect this growth, nor the ideas of the mother (unless, indeed, these factors affect her diet, her health, and thus indirectly the supply of raw materials out of which these action-patterns are being built).

Prenatal conditioning A number of attempts to demonstrate that stimulation can produce new integrations during the fetal period have been made. The first attempts all gave negative results; but in 1938 Spelt reported posi-

tive results.² Using a vibro-tactile stimulus placed against the mother's abdomen for 5 seconds (as a warning stimulus) and following this with a sudden loud noise which always evoked a reflex startle response in the fetus, he found that after about 100 paired presentations the warning stimulus alone came to produce the startle response. The conditioning was done during the last two months of pregnancy. Such a demonstration of the possibility of prenatal conditioning suggests that some of the development of behavior at this period may be due to external stimulation. No practical implications have been suggested, however, nor has research extended these observations, as yet.

NEONATE BEHAVIOR

In their general behavior and in the details of their physical development there are wide differences in the newborn. Some are sluggish, somnolent, others are placid but responsive, still others are fretful, irritable, easily frightened, prone to cry. The placid ones may nurse easily when first given opportunity; some of the sluggish ones will have to be taught. The fretful ones will sometimes nurse, and then regurgitate their undigested meal; and some of them will show a non-infectious type of diarrhoea, which seems to be produced by excessive intestinal activity (a part of their total emotional state).

The range of activity shows that growth during the prenatal period has completed literally hundreds of sensori-motor arcs. In the eye area the lids close reflexly, pupils contract and enlarge, eyes turn to follow a light source or swing quickly when the body is rotated. The coordination between the eyes is imperfect and convergence upon an approaching object rarely occurs. In the mouth area there are sucking, grimacing, spewing, yawning, licking, smiling, and pulling down the corners of the mouth. These reactions are tied to immediate tactual (or internal) stimuli—the smiling is not as yet a “smiling when smiled at” and the nursing reflex is not initiated by the sight of the breast. Alimentary, respiratory, and vocalizing reflexes include cooing, crying, sobbing, sneezing, coughing, gagging, swallowing, hiccoughing, vomiting. The head moves from side to side (especially at nose-cleaning), there is a shudder at bitter tastes, and as early as the second day some infants will balance the head when held. The arms are thrown outward when the child is startled, the reflexes of the forearm and fist are matured enough to give hand closure and arm flexion. In the trunk area there are arching of the back (when the nose is pinched, for example) and twisting. Abdom-

inal reflexes (drawing in of the stomach) and sexual responses (cremasteric,* erection) are functional Knee-jerk, achilles tendon reflex, flexion and extension of leg, kicking and reflex stepping (when child is held upright with feet touching the surface of table) and the plantar and Babinski reflexes† appear in the lower extremities Over-all responses such as the sleeping, nursing, defecating, stretching, postures are present There are a "fending" posture (in which if the head rotates toward one arm, that arm is extended, the other rotated), a "springing" posture (in which if the infant is held upright and inclined forward, the arms are extended forward and the legs are brought up), and a startle response (in which the arms fly apart, fingers are spread, legs are extended, and head is thrown back).³

Prematurity and Immaturity

Some of the variance in the performance of newborn children is due to actual differences in age, since some children are born (and survive) after 30 weeks of uterine life while others are not born until the 45th week The premature appears retarded, naturally, when compared with the norms for the average 280-day-old neonate The degree of his retardation is found to be proportionate to the degree of his prematurity; and with the passage of time this pseudo-retardation disappears A 10 per cent retardation at birth has dropped to 2.6 per cent at two years, and by four years it has become so small that it can no longer be reliably measured Although the transfer from the maternal to an external environment involves radical changes in alimentation and stimulation, it does not seem to alter the pacing of the maturation process which regulates the appearance of these early postural reflexes.⁴

Environmental Causes of Neonate Differences

We shall not do justice to all the facts, however, if we make the intrinsic factors that operate during the fetal period the sole cause of neonate differences It is true that under a wide range of living conditions the maternal blood stream continues to supply the fetus with the materials it requires for growth, and so long as the chemical composition of this stream of supplies remains within those narrow limits we call the "optimum," the pacing of growth is determined by the intrinsic (that is, genetic) factors But under some conditions the fetal supply becomes deficient. Rachitic conditions in

⁴ Contraction of the muscle that elevates the testicle, in response to stimulation of the skin of the thigh

† Plantar reflex: contraction of toes on stimulation of sole of foot

Babinski reflex: spreading of toes and extension of big toe in response to excitation of foot.

the neonate have been traced to this fetal environment. Specific deficiencies in vitamins and minerals will alter the tempo of growth, and if a marked deficiency occurs at the time one of the fetal structures is being laid down, a characteristic structural deficiency will show up in the neonate. Mongolian idiocy is believed to be due to such early developmental deficiencies and not to genetic factors. Since each stage of development has its own peculiar requirements, the same deficiency, occurring at different stages of development, can produce different anomalies of growth.

There is also evidence to show that mental deficiency can be produced in normal stock if the mother is exposed, during certain critical stages in the early period of pregnancy to (1) dosages of roentgen or radium radiation that reach the embryo, or (2) the disease known as German measles.⁵

The endocrine glands of the mother and the endocrine glands of the child pour their secretions into blood streams that share their chemical contents. If the larger maternal organism suffers a deficit of the thyroid secretion, for example, the maternal tissues will borrow from this common chemical milieu; and the homeostatic mechanisms of the developing fetus, attempting to compensate for this borrowing, may develop an excessive level of thyroid functioning. At birth it will show symptoms of hyperthyroidism (see Chapter 6, pages 134-138). A chronically emotional mother will discharge enough epinephrine (the product of the central portion of the adrenal glands, see Figure 17) to affect the child. This gland product is present in the blood stream in all of the emergency emotions (fright, rage, excitement), and if it is injected into any normal subject it will bring about cessation of salivation, inhibition of gastrointestinal tone, acceleration of the heart, increase in blood pressure, increase in muscular tone. Thus through this chemical linkage of blood streams separated by semi-permeable membranes, the emotions of the mother will affect the internal milieu (and hence the activity) of the fetus. Sontag was able to demonstrate that the weights of neonates are inversely correlated with the amount of fetal movement. Two thumbnail sketches of mothers who appeared in his series of cases will serve to illustrate the point.⁶

CASE 1 An unmarried mother who did not discover that her child's father was a married man until the pregnancy was well along was extremely unhappy and nervous throughout the pregnancy. Of a somewhat emotional temperament and moralistic background, her unhappiness was enhanced by the unsympathetic attitude of an elderly woman who cared for her with an obligato of continuous nagging and scolding. During the last six weeks of observation the fetus was extremely active. Born at term

the child weighed 5 pounds, 12 ounces. It proved to be active and irritable. There was no subcutaneous fat and its skin was wrinkled. Rapid growth brought it to the median weight by the ninth month. The mother had gained 12 pounds during pregnancy.

CASE 2. A young mother, 25 years of age, a college graduate, saw her husband grow into a manic psychosis during her first pregnancy. Without financial reserves, and with her husband growing more violent daily, the period was one of constant anxiety. The fetus was extremely active; the mother complained that she could not sleep because of the violence of fetal movements, and that the kicking of the child made her abdominal muscles sore. When the child was born it weighed 6 pounds, 8 ounces. Its legs and arms were like pipestems and it was both active and irritable. By the twelfth month of post-natal life it had reached the median weight of that age-group.

Since some fetal activity, in the later stages, is the result of external stimulation, the condition of the child at birth may record the after effects of such diverse events as persistent loud noises (blaring radios, a noisy washing machine, the roar of a nearby elevated), violent movements of the mother, and the like. Birth itself may be so difficult as to produce actual damage to the developing neural structures. Extended studies of the neonate suggest that this may be less rare than is commonly supposed. Routine lumbar punctures in infants within 24 hours of birth have revealed fresh blood in the spinal fluid in as many as 15 per cent of the cases.⁷ X-ray studies of bone scars, which are most commonly caused by periods of retarded growth, show that the cases of most difficult birth experience more pronounced physiological shock.⁸

Prolonged interference with fetal circulation during the birth process is another occasional cause of brain damage. Ten per cent of the newborn need assistance in respiration.⁹ Schreiber, examining birth records of 252 mentally defective children, where no history of mental defect in the family existed, found a history of asphyxia at birth in 76 per cent of the cases.¹⁰

The severity of the impact of birth varies in different social groups. About 9 per cent of all births occur without the aid of any physician; in rural areas this rises to 31 per cent. Mortality rates are much higher among Negroes (78 per thousand Negro live births will die in infancy) than among whites (47 per thousand). These figures give indirect evidence that may help us to evaluate some of the differences in development that will appear in our later discussion.

Summary of Factors That May Contribute to Variations in Neonate Performance

In our foregoing discussion we have found at least six types of factors that affect prenatal development. In evaluating the status of the neonate all must be borne in mind: (1) The genetic factors were discussed first, and to them we attribute the basic pace of development together with such capacities and susceptibilities as will later emerge in the traits of emotionality, intelligence, resistance to neuroses. (2) The duration of the gestation period is a second factor, prematurity giving the appearance of retardation. (3) The chemical milieu provided by the mother may be inadequate in certain vitally important building materials; or it may contain endocrine products in too great or too small amounts, resulting in borrowing from or excessive stimulation of the developing fetus. (4) Gross changes in the physical milieu (sounds, vibration, movement, roentgen or radium radiation, infection) may cause excessive fetal activity, and the indirect results of emotionality in the mother produce a similar effect. (5) Birth trauma (pressure, forceps injury, asphyxia) may be severe enough to produce irreparable damage and lead to sluggish or atypical development. (6) Finally, patterned sequences of stimulation, such as the waking-sleep rhythm of the mother, may contribute to the establishment of some of the patterned performances of the neonate.

Extent and Significance of Variability in Infant Behavior

If we disregard the few instances where atypical performance is clearly linked with conditions that will continue to determine a course of development through life (for example, where known ancestral conditions provide genetic pace-setters or where irreversible damage at birth has irreparably altered brain structure) we may raise the question whether the observed differences in the neonate have any predictive significance. Granted that infants differ, does their status foreshadow a similar adult status? Is their life-line already aimed toward a specific adult goal of development?

That there are wide divergences in infant behavior is clear from the measures now available. Sitting erect will appear in some children at the 20th week, in others as late as the 40th. Some will hold their heads erect at the 8th week (8 per cent) while others are not ready to do so at the 40th week (6 per cent). If we include the most precocious and the most retarded children in our age samples in the period from six to fifteen months, we will find DQ's ranging from 25 to 150. Yet in spite of the range of developmental rates, the vast majority advance with such a uniform pace, and at rates so

close to the norm, that we can almost agree with the Samoans who allow time (and the maturing of the cells) to carry the child across that gap between infantile helplessness and later common sense. Approximately two-thirds of our children will achieve DQ's falling between 90 and 110. As we shall observe later, a part of the constancy and uniformity in these developmental rates must be attributed to the constancy and uniformity in the cultural milieu, in the shared attitudes toward and folk wisdom about child-care; and where there are gross deviations from these external norms (or from the optimum conditions for growth) even the physical maturing is atypical. (See, for example, pages 93, 96, 97.)

Observations of the Hopi child The development of locomotion in the Hopi child suggests that in this area, at least, very little cooperation or support from the surrounding milieu is required. That *some* support is necessary we saw, earlier, in the case of Anna (page 93). Dennis's observations suggest, however, that the "specific exercise" in the walking function can be safely delayed.¹¹ Indeed the strengthening of the leg muscles which comes with creeping, crawling, and all the leg movements that occur in the unhampered and free reflex movements of the infant, can be postponed for some time.

During the first day of his life the Hopi child is wrapped in a blanket and bound to a cradle board. Removed only for his occasional bath, he eats and sleeps while bound to this board. Occasionally a child becomes so accustomed to sleeping in this fashion that even after he has left the board and is running about, he will come dragging his cradle board to his mother when he gets sleepy and ask to be put to bed upon it. This board is in constant use for the first three months, and the child gets little practice, therefore, in exercising his limbs. He is like one of the delayed chicks in the experiments with the pecking of chicks.

Gradually, beginning with a few hours a day, the mother allows the child out of the board, but its use is continued up to six months of age. As the child matures he begins to kick against the confinement of the cradle board, and if he is unusually restless his mother may free him before the usual time. Sooner or later his developing action patterns make confinement frustrating. Like a maturing chick he breaks through the shell that restrains him. Here growth dictates a transition in training.

The history of early confinement does not retard the date of walking, reaching, manipulating, in the Hopi child. The sitting, creeping, walking, sequence emerges in the usual order. The existence of some orthodox and some modernized Hopi communities within the same area provided the

means of testing the effect of the cradle board, for the former group used the board while the latter had discarded it altogether. Dennis observed the incidence of walking in 63 confined and 42 unconfined Hopi infants and found that the difference between the two groups was negligible. The average cradle-board child walked at 14.98 months, the average control at 15.05 months.

A study of bladder control It is difficult for the mother to believe that the success of her training in bladder control also depends upon an intrinsically paced maturation of action systems, although the difference in the ease with which children acquire these habits is a matter of common observation. The training is sometimes very difficult, especially if it is premature. (For the average child any training prior to 8 months is considered premature. The cases McGraw reports indicate that there are wide deviations in the age of maturing in this function, however.) Where the mother's striving for perfection leads her to seek the earliest possible control, she has to be constantly on the job, and sometimes it seems to her that the child *wilfully* resists her training. Training there must be, in any case; but when? In an experimental study McGraw worked with two sets of identical twins, giving one member of a pair hourly training during the waking period until success was achieved.¹² The other member of each pair was not given training until the successful one had demonstrated the possibility of control. In each instance the untrained twin, mature at the beginning of training, achieved successful control almost at once. Three hundred days preceded the abrupt achievement of success in the one member of the first pair, five hundred days in the case of the trained member of the other pair, training beginning at the 23rd day in the former case and on the 41st day in the second (see

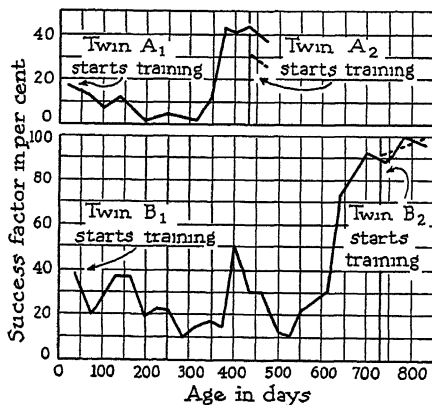


FIGURE 12. Per cent of successful responses to toilet training situation by two sets of twins. [From McGraw, p. 124.¹²]

Figure 12). Contrast these long training periods, in which there was little or no learning, with the brief training required once the neuromuscular mechanism became sufficiently mature

Although McGraw speaks of the period of rapid progress as the period in which the cortex of the brain first participates in the voiding reaction, and although she refers to the necessary antecedent neural maturation as the prerequisite of successful training, this interpretation of the abrupt transitions in performance has only the force of analogy. No independent study of neural maturation of paths joining cortex to bladder provides a basis for this interpretation. What has been shown is that a developmental level must be reached before training in certain acts is efficient. And we have still to face two questions: whether the pace of development in one act is coördinated with the pace of other acts, and whether the early maturation of the simple neuromuscular coördinations foreshadows some final status in "general intelligence "

The pace of development in identical twins In McGraw's study the members of each twin pair arrived at maturity (in voiding) at the same time, although there was approximately 300 days difference between the pairs. As in the measurement of intelligence at an older age period, the identical twins, with identical genetic endowment, seem to traverse the early months of growth at nearly identical paces. Gesell and Thompson emphasize this point in their study of locomotion in a pair of identical twins. One of the twins, given special training in stair climbing, achieved some improvement, but the delayed twin caught up with him when given opportunity to practice. In eye-coördination, pellet-prehension, sitting erect, walking, and dozens of other test items extending into the area of language and social behavior, the identical twins followed the same patterns of growth and at the same rates. These experimenters, like McGraw, see the timing and the resemblance as evidence of intrinsic maturational controls. They write. "The sequential patterning of behavior expresses itself in progressive differentiations within a total action-system. The basic order and the general modality if not the specific outline of these differentiations are determined by intrinsic factors."¹³

In none of these studies, however, were the controls rigorous enough to prove that the required maturity level was reached purely by an intrinsically regulated growth. There are questionable aspects to their training techniques and, of necessity, serious limitations to the extent to which extrinsic factors could be modified with human subjects.

GROWTH IN LATER CHILDHOOD

Nine Years of Growth

All our observations up to this point deal with early infancy. Does the early pace continue into later years? Nancy Bayley has followed a group of 48 white children from homes in Berkeley, California, making monthly measures of their progress over a period of nine years.¹⁴ The children came from widely diverging types of background (parental education, family income, medical care, parental IQ, and so forth) although the extremes of poverty were avoided. The tests consisted of a series of carefully standardized measurements modelled upon the items that a half dozen or more investigators had previously found useful in differentiating stages of development. The table below presents the correlations between tests given at different periods of the child's growth and his status at six years. The figures show that during his first nine months of growth the child is not like his older self at all *in these measures*. The developmental quotients based upon measures of sitting erect, finger and hand coordinations, visual pursuit movements, and the like, do not show any relationship to the quotients based upon measurement of verbal-symbolic skills such as are found in the intelligence tests given to the six-year-olds. Whatever the significance of the

Correlations of Early Test Scores with Scores for the Sixth Year

AGE IN MONTHS AT WHICH EARLY TESTS WERE GIVEN ^j	CORRELATIONS WITH SIXTH YEAR SCORES ⁱ
2	-.13
5	-.07
8	.02
11	.20
14	.30
21	.50
30	.70
48	.82

* The scores for the first, second, and third months were averaged in order to get an index for second-month development. Similarly, scores for the fourth, fifth, and sixth months were used to get the five months index, etc.

^j The six-year status was an average of performance at 60, 72, and 84 months.

norms for the first nine months, the child's status at this point is not a good basis of prediction of his later scholastic aptitude or similar abilities

Bayley also studied the relationship between this developmental pace and certain measures that characterize the so-called better homes. Do the children of educated parents have higher IQ's? Do these children show higher developmental quotients in the early months? And is the developmental status of the infant (in prehension, sitting, creeping, and the like) related to the economic status of the parent? Do better homes, in short, produce better infants in terms of the items measured in these developmental tests?

The measures shown in the second table indicate that the answers to these questions depend upon the age at which the child is measured. The relationship to parental status is quite evident at ten years; but it does not appear at all in the first year, is weak until the end of the second year, and has not settled down to its final value (correlations of .50 or more) until the end of the fourth year. *The resemblance to parental status develops gradually through the first four or five years and does not increase beyond that point.*

*Correlation of Children's Test Scores with Parents'
Education and Income*

AGES IN MONTHS AT WHICH CHILDREN WERE TESTED	CORRELATION WITH MID-PARENT EDUCATION	CORRELATION WITH 1938 FAMILY INCOME
2	-.14	.20
11	.02	.04
24	.50	.38
36	.47	.30
60	.58	.58
96	.59	.61
120	.54	.59

* Average of father's and mother's education in years

The low resemblance to parental status in the early months, and the lack of predictive significance in these scores, suggest three considerations:

First. There are marked changes in the child's status from test to test in the early months. For one thing there are fewer items to measure, and a deviation in a single item affects the developmental quotient markedly. Changes

in a child's score from values "markedly above average" to values "below average" in successive tests (given every two months) are not uncommon ¹⁴

Second. There is a marked change in the nature of the test items as we approach the older years. *Sitting erect* and *responding to words* are quite different tasks when an observer is interested in discovering the degree to which the human environment collaborates in the developmental process. The earlier test items, as a group, are more concerned with physical coordination; and the performance of the child is a product of maturation plus the kind of practice that occurs inevitably as one limb (or receptor) affects another part of the body. The earlier development involves a coming to terms with an impersonal environment. A great deal of the practice involved could occur in solitude as well as in a human milieu.

Furthermore, in spite of variation in rates of growth of these earlier motor coordinations, almost all children have passed them by the 18th month. The degree of variability in the early tests fluctuates sharply, rising from the neonate to the 6th month peak, falling to a low at 12 months, and then rising steadily from this point on. The children are most alike at 12 months. At this very point the verbal skills begin to appear and the human environment instigates and teaches a new complement of behavior patterns. And it is at this point that resemblance to parents begins.

In the simpler neuromuscular coordinations (such as in pellet-prehension, sitting erect, locomotion) each child appears to develop at his own pace, and his date of arrival at these goals is of little predictive significance. (We would do well to recall Donald and Gaa, pages 96-97.)

Third. That mental growth from ages two to six is markedly affected by the human environment is demonstrated by many studies. The principal facts may be summarized, briefly:

- a. Children who are placed in foster homes at an early age tend to resemble their foster parents and foster brothers and sisters
- b. This resemblance is greater when the placement is made very early. Adoptions made after six show little or no resemblance
- c. The higher the rating of the foster home (on socio-economic indices) the greater is the increase in the child's IQ following placement
- d. Siblings separated at adoptions and placed in widely differing foster homes differ more than siblings placed in the same home or in homes of similar ratings.
- e. Changes in IQ in the expected direction of as much as 5 to 15 points are reported in studies measuring these effects in groups of children. (These are *average* values.)

- f. Unrelated children in the same home resemble one another as much as do brothers and sisters who grow up in different homes.
- g. Shifts of as much as 20 points on the IQ scale seem to represent the maximum gain that is to be expected, when adoption or placement in a foster home (of superior type) is made early.¹⁵

The influence of nursery school experience Studies have shown that even the few hours spent in a nursery school affect the rate of progress in the skills measured in the usual developmental tests. Some studies have reported a brief period of acceleration which is not maintained. This could be interpreted as evidence that each child has a basic growth rate and that there will always be a recession to this basic rate; but until there are longitudinal studies which make an effort to consolidate the gains resulting from special training, such a conclusion is premature. It is possible, for example, to teach the average child of four years to read, with a few minutes practice each day;¹⁶ but whether his reading skills at age ten will be superior, or whether he will have a greater interest in reading, depends upon what happens subsequently. And the long-term studies have not been made. It is obvious that if ability to read is considered an important skill, and if this item is included in a developmental test, the children who have been given special training will appear to be growing at a faster rate. Whether reading skill is the type of visual-motor coordination we should be teaching at four years is an entirely different matter. The logic of the testing procedures would seem to indicate that the kind and rate of development we get reflect the values of the adults responsible for training, and if these factors vary from child to child the developmental measures cannot be taken as an index of intrinsically regulated paces of growth *even when such intrinsic factors exist*.

The mental growth of mountain children We have already discussed the impact of Colvin Hollow upon its children. It will be recalled that Sherman discovered that when IQ's of the younger children were studied a greater variation was found than was the case at the later ages. The older children were, in fact, more alike than is the case in the average community, and they resembled one another more than did their younger siblings. Moreover, the average of their intelligence test scores had fallen steadily throughout their development. Although mental growth occurred, it was at a slower than average rate, so that the divergence between this group and the national norms steadily increased. At least five investigators have reported similar findings, as noted in the accompanying table.

Studies of Mountain Children, Showing a Decline in Average IQ with Advance in Chronological Age

Investigator	Results of early tests		Results of later tests		Decline in Av IQ
	AGE (YRS)	AV IQ	AGE (YRS)	AV IQ	
Hirsch	5-6	87	14	75	12
Asher	7	84	16	65	19
Wheeler	6	95	16	74	21
Sherman-Key	6-8	84	14-16	52	32
Edward-Jones	7	105	15	70	38

References for the five studies will be found at the end of the chapter ¹⁷

The data on the mountain children are admittedly ambiguous for the skeptical mind which demands positive proof, at least when clear-cut causal interpretation is sought. In Kentucky, for example, there are blue-grass counties and mountain counties not far apart. They are inhabited by people of the same general racial stock, but the people in the neighboring counties are living at two quite different cultural levels. President Hutchins, of Berea College, liked to refer to the mountain people as "our contemporary ancestors"; and it is true that sociologically many mountain communities resemble, in culture, a pre-revolutionary America. The content of the mountain child's training is vastly different from that which the blue-grass town and school provide, and when the survey of the school children in the mountain counties shows that they have an average IQ of 70-75, as against the average of 100 for the blue-grass counties, we wonder whether it is this content that makes the difference. An enthusiastic geneticist might be expected to attribute these differences to differences in the human stock found in these communities and then to infer that it was the abler and more active pioneer fathers who were not content with a holding in the hills, and the less gifted who, either because of a lack of drive or ability, remained behind, content with their meager cabin in the hills. Intensive studies of some of these mountain communities reveal that there are many isolated sections where the descendants of two or three family stocks have intermarried for generations. In one community 900 residents could trace their ancestry back to two family stocks, one of which was afflicted with chorea, the other of which had an extremely low intelligence. In many families in this community all members suffer from one or the other, or a combination, of these defects

Applying urban criteria to mountain children It is possible, too, that in constructing intelligence tests for urban children items will be selected which, while wholly familiar to the urban children, will be utterly foreign to the child raised in the hills, and hence will not measure *the growth that actually occurs*. It would not take very many of these items to make the whole atmosphere of the testing situation take on a halo of foreignness, of bafflement, of "unfairness." When the items in a standard test (Stanford Revision of the Binet-Simon test) such as was used in the reported comparisons of urban and mountain children are scrutinized, the following items appear to be weighted in favor of the urban child.

Counting pennies, naming coins, making change, computing the cost of purchases in a store in an imaginary problem situation, describing pictures, copying diagrams. Some of the tasks involve familiarity with toys, playing fields, oranges, gowns, plumbing, sports, working for wages, rivers, deserts, lakes, city dwellings, police, firemen, railroads, engineers, bicycles, hospitals, newspapers, pieces of wire, kings and presidents, nearest police station, doctors, lawyers, ministers, salaries of \$20 per week, \$50,000 losses, center of a city, the discovery of a body by the police, etc. There is repeated emphasis upon the sense of time (what to do if tardy, naming the days of the week, telling time, giving the date) and the mountaineer is notorious for his lack of time-consciousness.

Even if we question the value of the items measured for our purpose of measuring growth we can agree with Sherman that Colvin Hollow children (and several million besides in America's 36 million children) spend the most important years of their lives in dreary, unstimulating (and sometimes degrading) surroundings, deprived of many conditions that most of us would call vital for mental growth. In 1935 there were twelve million American families who lived on an annual income of less than \$1000, and it was in precisely these families that the birth rate was highest.* One observer points out that the families having an income of less than \$750 per annum gave us one third of the children born in the year 1929. The studies of mountain children would lead us to suspect that an application of our measures of mental growth to this third would show that, whereas they will start out at five or six years with a slight handicap, their divergence from the national norms will grow wider with the passage of years. And the figures indicate clearly that where the conditions for growth are the poorest, the birth rate is highest.¹⁸ Either we must admit that, as an adventure in human engineering and

* While 1950 figures indicate increased dollar income for families at this level, the decrease in the value of the dollar suggests that there has been little *real* change in their economic status.

social planning, our production of human beings leaves something to be desired, or we must consider the skills measured by the tests as of little significance.

Group differences in mental growth within an urban area Even within an urban area children develop at divergent rates; and if we classify them according to the occupational status of their parents, group averages are found to hold in remarkably consistent fashion throughout the ages found in the public schools. On the hypothesis that these differences are due to differences in family background, we might look for a cumulative effect, much like that found in the measurement of mountain children. A study by Shuttleworth¹⁹ shows consistent, rather than cumulative differences, however. The data were obtained from two groups of children, 53 of whom had fathers in the professional-managerial-business group, and 131 of whom had fathers classified as semi-skilled or unskilled laborers. Two intelligence tests per year, averaged, provided the annual IQ index. The differences between the groups fluctuated but very little. The table below presents a summary of Shuttleworth's findings.

*Average IQ of Children of Two Occupational Groups
at Ages from 8 to 18*

AGE IN YEARS	<i>Professional-Business- Managerial</i>		<i>Semi-Skilled and Unskilled</i>		DIFFERENCE
	NUMBER	MEAN IQ	NUMBER	MEAN IQ	
8	13	109.3	34	95.1	14.2
10	46	108.9	91	97.8	11.1
12	45	108.0	99	96.8	11.2
14	47	107.8	105	97.1	10.7
16	44	105.9	108	95.5	10.4
18	11	108.3	33	95.4	12.9

The absence of a cumulative effect does not, of course, demonstrate that the environment is ineffective. It is possible that the *school* environment has operated in a direction counter to the home-determined differentials, stimulating the less advantaged group and retarding the more favored children. It is also possible that the environment has already achieved its maximum effect, and this is in line with the studies of foster children. It is also possible that the differences are really genetically determined. Theoretically, in a country where the career is open to talent the less desirable status will attract individuals with a lower growth potential, a growth potential that would operate consistently through the whole span of growth.

Physical and mental growth. gross relations. If an observer were to select the physically retarded half of the school rooms of a city he would find that this half contained more than its share of the educationally and intellectually retarded children. Or, if he were to select the areas of our country where mental growth is most sluggish (as measured by metropolitan educational standards or the conventional mental tests) he would also find this to be an area of physical retardation. There is a certain homogeneity in the gross aspects of growth. When Dunham and Faris compared various areas of Chicago they found a particular district north of the loop where the rates for schizophrenia, delinquency, insanity, ill health, poverty, divorces, illiteracy, feeble-mindedness, were constant companions. In such areas the genetic and constitutional factors will go hand in hand with the environmental factors, these least favorable areas serving to collect the biologically unfit and in turn acting in such a way as to suppress and malform what fitness there is. Here the least advantaged competitors in our society rear children under conditions that maintain their disadvantage.²⁰

Physical growth of children of the upper middle class. Peatman and Higgons have presented data for a group of children from better-than-average homes in a suburb of New York City. These children had all of the material advantages that the better homes in a metropolitan area could afford: prenatal care of mothers, hospital delivery, carefully supervised diets, clean surroundings, adequate nursing care, etc. These children show their above-average status, physically, at one month of age (a half-inch in height and 3 ounces in weight, for the boys) when they are compared with the national norms for their age group. By their 60th month their physical superiority has increased (2.3 inches in stature and 3.7 pounds in weight). Figure 13 shows the divergent course of growth in the boys.²¹

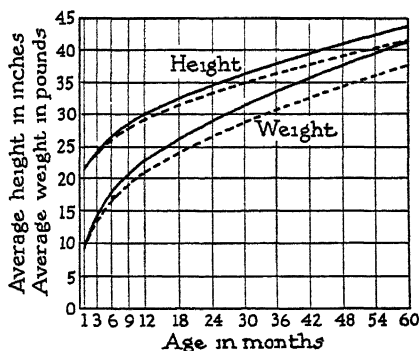


FIGURE 13. Growth of boys in a better-than-average suburban area (solid line) compared with national norms (broken line) [From Peatman and Higgons, p. 166.²¹]

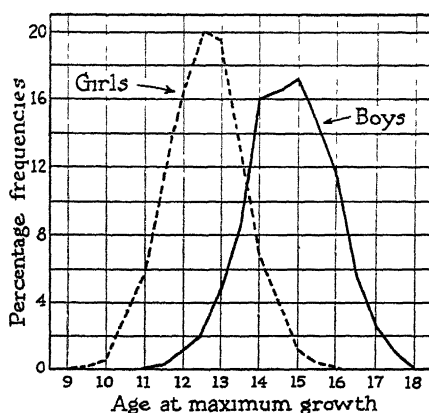


FIGURE 14 Ages at which boys and girls reach maximum growth [From Shuttleworth, p 9¹⁸]

The Growth Spurt: Fast and Slow Growers

In studying both physical and mental growth, the gradually sloping curves that represent the changing average values for *groups* give a false impression of the events within the life cycle of the individual. The spurts and plateaus of individual curves are lost when average values are plotted. Even the spurt in height at adolescence, which common observation has always known about, disappears when group averages in height are studied. This adolescent spurt can arrive as early as the ninth year or as late as the seventeenth, and there will be a few cases falling outside these extremes. Figure 14 shows the distribution of these "ages of maximum growth" recorded in Shuttleworth's study of children in the Boston area.²²

Figures 15 and 16, also from the Harvard Growth Study, show fluctuations in intelligence over the period 8-16 years. This, it will be recalled, is the period when the *group data* indicate a great deal of stability. The figures show that a group of individuals starting with the same IQ may arrive at quite different destinations; and, conversely, individuals starting from widely separated statuses may achieve the same final level. These cases indicate that prediction of an *individual's* final status on the basis of early measures is not possible with a high degree of accuracy or certainty. The probable scores of *groups* can be predicted.

Shuttleworth found that his early growers tended to be slightly more intelligent than his late growers, when group averages were compared; but the differences were small and for the most part not statistically reliable. Nevertheless, they appeared at every age, in both sexes, and in each of 23

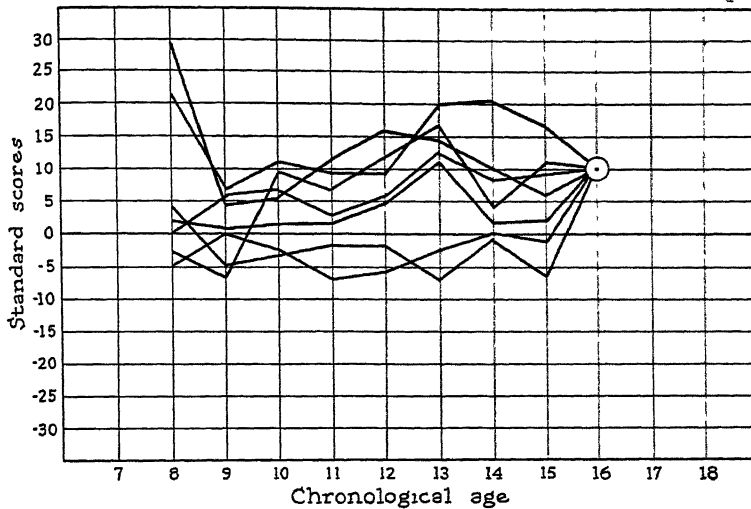


FIGURE 15 Variability in mental growth, shown in terms of standard scores of seven girls over the period from age 8 to age 16. At 16 all reached a position 10 units above the mean score for 256 subjects (age 16) [From Dearborn and Rothney, p. 180.²²]

intelligence test scores used in the study. Supporting this finding of Shuttleworth is the observation of Stone and Barker that when teen-age girls of the same chronological ages are divided into two groups on the basis of sexual maturity (pre- and post-menarcheal groups) the early-maturing group is slightly superior in intelligence.²³

Is there a "growth spurt" in mental abilities at adolescence? Folk-wisdom gives contradictory counsel on the question of whether a "growth spurt" in mental ability takes place at adolescence. On the one hand, it senses the new "grown-up" outlook upon the world, advises new methods of treatment, and demands from youth a new seriousness in demeanor, an interest in and concern about adult problems. On the other hand, this same folk-wisdom urges special lenience for the rapidly growing adolescent, occasionally offering the spurt in physical growth as a partial explanation for lack of progress in academic studies, as though the vital energies were so involved in the growth of tissues that no surplus remained for book-learning.

To date the reported studies agree that there is a slight acceleration in mental growth as measured by intelligence tests at the period in which physical growth speeds up.²⁴

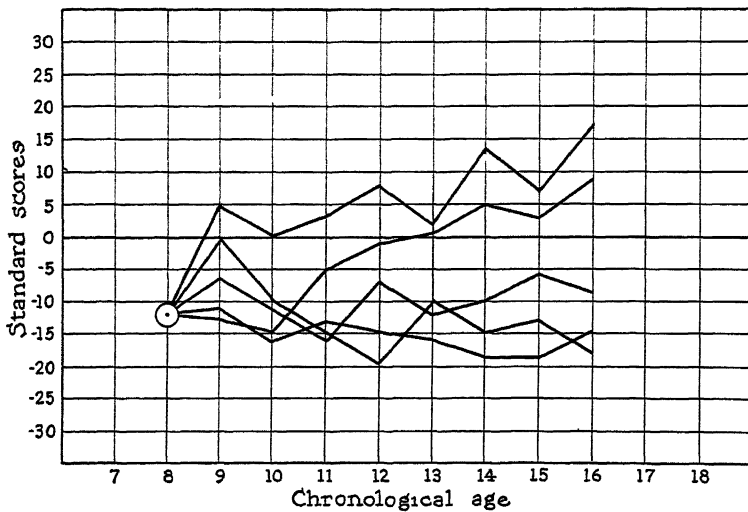


FIGURE 16. Variability in mental growth, shown in terms of standard scores of five girls. At age 8 all were at a position 10 units below the mean for 256 subjects (age 8) [From Dearborn and Rothney, p. 183²²]

On the other hand, when Dearborn and Rothney compared the gains in *scholastic* subjects (as measured by standardized tests in arithmetic and reading) with the rates of physical growth in 522 boys and 550 girls between 11 and 14 years of age, they found no significant relationships²⁵. Selecting the 100 most rapid growers and comparing their gains in arithmetic and reading with those of the 100 least rapid growers revealed slight advantages for the fast growers; but the interpretation of this fact is complicated by the inclusion in the rapid growing group of more children with high IQ's. The over-all impression given is that there is no clear relationship between the two factors measured and that educational policies should not be framed in anticipation of either marked spurts or slumps in academic achievement at the time of maximum physical growth.

REFERENCES

1. Ruth Benedict and Gene Weltfish, *Races of Mankind* Public Affairs Pamphlet No. 85
2. David K. Spelt, "The Conditioning of the Human Fetus 'In Utero,'" *Journal of Experimental Psychology*, 38 (1948), pp. 338-346

- 3 See Norman L. Munn, *Psychological Development* (Houghton Mifflin Company, 1938), for an excellent summary of work in this area
- 4 A. L. Benton, "Mental Development of the Prematurely Born," *American Journal of Orthopsychiatry*, 10 (1940), pp 719-746
- 5 Douglas P. Murphy, "Mental Deficiency from the Viewpoint of the Obstetrician," *American Journal of Orthopsychiatry*, 19 (1949), pp 120-124
- 6 L. W. Sontag, "The Effect of Fetal Activity on the Nutritional State of the Infant at Birth," *American Journal of Diseases of Childhood*, 60 (1940), pp 621-630
- 7 Roy Grinker, *Neurology* (Charles C. Thomas, Publisher, 1934), p 801
- 8 L. W. Sontag and George Comstock, "Striae in the Bones of a Set of Monozygotic Triplets," *American Journal of Diseases of Childhood*, 56 (1938), pp. 301-308.
L. W. Sontag, *The Samuel Fels Research Institute* (Antioch College, 1938), p. 34. A report of a program of research
- 9 M. A. Ribble, "Infantile Experience in Relation to Personality Development," Chapter 20 in *Personality and the Behavior Disorders*, Vol II, J. McV. Hunt, editor (The Ronald Press, Inc., 1944)
- 10 F. Schreiber, "Apnea of the Newborn and Associated Cerebral Injury: A Clinical and Statistical Study," *Journal of the American Medical Association*, 111 (1938), pp 1263-1269.
——, "Mental Deficiency from Prenatal Asphyxia," *Proceedings of the American Association for the Mentally Deficient*, 44 (1939), pp. 95-106.
- 11 W. Dennis, "The Effect of Cradling Practices upon the Onset of Walking in Hopi Children," *Journal of Genetic Psychology*, 56 (1940), pp 77-86
- 12 Myrtle B. McGraw, *The Neuro-muscular Maturation of the Human Infant* (Columbia University Press, 1943).
- 13 Arnold Gesell and Helen Thompson, "Learning and Maturation in Identical Infant Twins," Chapter XIII in *Child Behavior and Development*, Barker, Kounin, and Wright, editors (McGraw-Hill Book Company, Inc., 1943), p. 225
- 14 Nancy Bayley, "Mental Growth during the First Three Years," Chapter VI in *Child Behavior and Development*
——, "Mental Growth during the First Three Years: A Developmental Study of Sixty-one Children by Repeated Tests," *Genetic Psychology Monographs*, 14, No. 1 (1933)
——, "Mental Growth in Young Children," and "Factors Influencing the Growth of Intelligence in Young Children," Chapters II and III in *Thirty-ninth Yearbook of the National Society for the Study of Education* (1940).
- 15 An excellent summary of the literature on this question can be found in *The Meaning of Intelligence*, by George D. Stoddard (The Macmillan Company, 1943).
- 16 Helen P. Davidson, "An Experimental Study of Bright, Average, and Dull Children at the Four-year Mental Level," *Genetic Psychology Monographs*, 9 (1931).
- 17 N. D. M. Hirsch, "An Experimental Study of East Kentucky Mountaineers," *Genetic Psychology Monographs*, 3 (1928), pp 139-244
E. J. Asher, "The Inadequacy of Current Intelligence Tests for Testing Kentucky Mountain Children," *Pedagogical Seminary and Journal of Genetic Psychology*, 46 (1935), pp 480-486
L. R. Wheeler, "The Intelligence of East Tennessee Mountain Children," *Journal of Educational Psychology*, 23 (1932), pp 351-370
Mandel Sherman and Cora B. Key, "The Intelligence of Isolated Mountain Children," *Child Development*, 3 (1932), pp. 279-290

A S Edwards and Leslie Jones, "An Experimental and Field Study of North Georgia Mountaineers," *Journal of Social Psychology*, 9 (1938), pp 317-333

18. Constantine Panunzio, "Population Trends in the United States," *Scientific Monthly*, 54 (1942), pp 353-360

Recent Social Trends in the United States, Report of the President's Research Committee on Social Trends (McGraw-Hill Book Company, Inc, 1933).

Problems of a Changing Population, Report of Committee on Population Problems to National Resources Committee (U S Government Printing Office, 1938)

National Resources Committee, *Consumer Incomes in the United States Their Distribution in 1935-6* (U S Government Printing Office)

19. Frank K. Shuttleworth, "The Physical and Mental Growth of Girls and Boys Aged Six to Nineteen in Relation to Age at Maximum Growth," *Monograph of the Society for Research in Child Development*, 4 (1939), Serial No 22, No 3

20 R E L Faris and H W Dunham, *Mental Disorders in Urban Areas* (University of Chicago Press, 1939)

21. J G. Peatman and R A Higgons, "Height-Weight Variability from Birth to Five Years of Age for Children Reared with Optimal Pediatric and Home Care," *Journal of Genetic Psychology*, 54 (1939), pp 165-180

———"Growth Norms from Birth to the Age of Five Years A Study of Chil-

dren Reared with Optimal Pediatric and Home Care," *American Journal of Diseases of Childhood*, 55 (1938), pp 1233-1247.

R M Woodbury, *Statutes and Weights of Children under Six Years of Age* (United States Department of Labor, Bureau of Publications, No 87, 1921).

22. Shuttleworth, *op cit*.

Walter F Dearborn and John W M. Rothney, *Predicting the Child's Development* (Sci-Art Publishers, 1941)

23 C P Stone and R G Barker, "Aspects of Personality and Intelligence in Post-menarcheal and Pre-menarcheal Girls of the Same Chronological Age," *Journal of Comparative Psychology*, 23 (1937), pp 439-445

24 E M Abernethy, "Relationships between Mental and Physical Growth," *Monograph of the Society for Research in Child Development*, 1 (1936), No 7

H E Jones, Unpublished manuscript, Institute of Child Welfare, University of California Reference in Conrad, Freeman, and Jones, "Differential Mental Growth," Chapter IX in *Forty-third Yearbook*, Part I, National Society for the Study of Education (1944) Jones found that 75 per cent of his early maturers surpassed the mean IQ of the late maturers, in the 7th grade By the 11th grade this superiority had vanished Abernethy showed positive correlations between mental test scores and sexual maturity through ages 9 to 17

25 Dearborn and Rothney, *op cit*

CHAPTER 6

Chemical Aspects of the Growth Process

The chief concern of this chapter is with the relation of the glands to growth and development. Before taking up the functions of various glands, however, we should note one other factor—diet.

GROWTH AND DIET

The growth of any species can be altered by controlling diet. McKay found that he could increase the life span of albino rats, delay or wholly suppress the changes of puberty, interrupt oestrous cycles that had already appeared, and decrease the ultimate size of the mature animals. Contrariwise, by feeding them an enriched diet he could accelerate puberty, increase fertility, lengthen the reproductive period, shorten the total life span. In the underfed, delayed, stunted females the ovulation rhythm is disturbed or suppressed, and in the male, copulatory behavior is delayed.¹ Other studies have demonstrated that the effect of a 20-day period of nutritional deficiency is greater when the period is placed in the earlier portion of the developmental cycle as compared with the effects of deficiency beginning at 20, 30, and 45 days.²

Mason reports that there are numerous records of retardation or suppression of the sexual function in human beings and in domestic animals during periods of extreme famine. In these instances the uterus of the female shows a regressive change toward an infantile form. Restoration of an adequate diet reverses many, if not all, of the changes.³

THE ENDOCRINE GLANDS

Endocrines and Growth

The growing organism converts the chemicals it ingests as food into bodily tissues. Even in the single fertilized cell there are inside regulators of this process, for the organism is selective from the beginning. For example, each of the members of a pair of non-identical twins builds his own individual organic pattern, drawing the materials from the common maternal blood supply. When these twins are of opposite sex each of these organic patterns will contain, among other structures, the glands of internal secretion that are characteristic for the sex of the individual, and each will follow the pattern of changing rates of growth that is characteristic for the sex of the child.

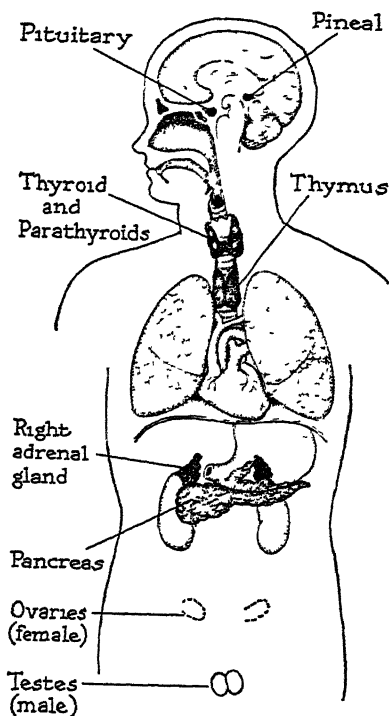
In developing these gland tissues the very process of growth builds secreting cells, which in turn become internal pace-makers for further growth. If the genes establish the rough outlines of the individual's destiny in the first place, the endocrine glands* become the executors or administrators of that destiny. Chemical or surgical interference with their work may alter the growth of the individual as effectively as though his original genetic endowment had been tampered with.

Glands and Behavior

As pacemakers for the whole growth process these secreting cells operate by throwing their chemical products into the blood stream. Carried to the growing cells these chemicals accelerate some processes and retard others, producing varying effects upon the already chemically differentiated tissues, accelerating changes in the reproductive organs, vocal cords, hair cells, breasts. And since they have acted as pacemakers for the building of these characteristic structures, may we not also regard them as pacemakers for behavior? It is apparent from physiological studies that the growth spurt of adolescence is accompanied by changes in the endocrine system. Shall we not, therefore, look upon the characteristic changes in adolescent *behavior* as paced by these glands? Is it not possible that these pacemakers will furnish the key to many of the mysteries hidden under the term "sexual instinct"?

* Gland tissues are commonly classified into two groups: (1) the duct glands, which pour their secretions upon the body surface (e.g. sweat glands) or into the alimentary tract (e.g. salivary and gastric glands), and (2) endocrine glands, which pour their secretions into the blood stream (e.g. adrenals, thyroid, pituitary, thymus, pineal, gonads).

FIGURE 17. Diagram showing the location of the principal ductless (endocrine) glands.



Glands and the Nervous System

The relationship between the endocrines and the nervous system is not a simple one. In one sense the glands are primary, for they were in existence as secreting cells before the nervous system supplied them with inhibitory and excitatory fibers. They are known to influence the course of growth of the nervous system itself. The mentally defective cretin and the mongolian idiot are illustrations of defective development of the nervous system of endocrine origin, and the dramatic depression of development of all intellectual functions in these cases illustrates the potency of endocrine control. Both have been attributed to thyroid gland deficiency in the fetal period. In the case of the cretin the effect can be partially counteracted by thyroid medication; but in the case of the mongolian idiot the changes have proved irreversible ⁴

Sooner or later, however, the endocrine structures fall at least partially under the dominance of the organism as a whole, and the nervous system instigates and depresses their activity. Many of the details of the innervation of these glands are unknown at present; but it is generally understood that each of them is subject to two types of excitation. Direct evidence of nervous

control of glandular tissue is familiar to all of us in the instance of salivation. When our mouth waters at the sight of an appetizing dish it is through neural excitation that the gland is thrown into operation. Similar neural connections (identified with certainty in the case of the adrenal glands, which will no longer put out adrenalin when denervated) are believed to act upon each of the glands of internal secretion, either through direct nerve supply to the gland cells or indirectly through the control of rate of blood flow through the gland tissues. When we remember that some of the impulses flooding the nervous system originate in the external matrix and that glands (like other effectors) are subject to conditioning, we can see that external stimulation can alter internal chemistry and growth. Another indirect control is through food supply and dietary habits. The observations of McKay, already noted, demonstrate that extreme undernourishment prevents the normal growth and functioning of the reproductive glands.

THE THYROID GLAND

The pot-bellied, slow-growing, dwarfed, and mentally sluggish cretin is a vivid example of what severe and chronic deprivation of thyroid secretions can do to the process of growth and development. An equally dramatic demonstration of the effect of its secretions upon the maturation process is the fact that a few drops of iodine (the principal chemical component in the glandular product) added to the water in which tadpoles are developing will convert them into tiny frogs as small as flies within a two-week period (a transformation that does not ordinarily occur in the bullfrog until the second or third season of growth has been completed). In this case the metamorphosis is in both structure and behavior: the animal is transformed from dependence upon an aquatic-swimming action system to an air-breathing, hopping creature. Growth has been accelerated, and the maturation of structures produces suddenly a whole new set of action patterns. Deprived of thyroids, on the other hand, pollywogs remain at the pollywog stage though as large as mature frogs.

This contrast between the fast and slow growth, the alert and sluggish behavior, indicates something of the nature and range of thyroid effects. Like an open damper which permits an entering draught to quicken vital fires, the thyroid secretion speeds chemical change in almost every tissue. The basal metabolic rate rises and falls with thyroid output; and when the rate of transformation of energy falls too low, as in the hypothyroid individual who lacks the normal amount of glandular secretion, the individual will be-

come fatigued rapidly and will respond sluggishly. Characteristically he will develop defenses against a too-demanding environment. A part of the difference in energy output between youth and age, between a lively youngster and a tired school teacher, can be traced to levels of thyroid output and to differences in metabolic rates. With the onset of age the thyroid output decreases, energy consumption falls, and the fat-and-forty waistline grows.*

Over-secretion of the gland (hyperthyroidism) in adult human subjects may become excessive to the point of endangering health. These patients are, as a group, excitable, nervous, tense, quick to react and inclined to over-react. Heart and alimentary tract show accelerated contractions, blood pressure is elevated, and a fine tremor may be noted in the extended fingers. In the throat area above the gland the throbbing pulse is easily palpable. The characteristic protruded eyes of the hyperthyroid are a caricature of fright, and excitement. The proximate cause of this protrusion lies in the tension of the smooth muscles of the eye socket, a tension that exists in the musculature in general and gives a trigger-like character to the stimuli acting upon the patient. His tension is easily converted into the full-blown emotional response.

There is a temptation to extend this clear contrast between the sluggish and stupid cretin and the alert and excitable hyperthyroid patient into the middle ranges, and to make differences in gland physiology account for the whole scale of emotionality and intelligence; but the available evidence indicates that so many additional factors contribute to these differences that the simple and clear relationship between endocrine status and these mental traits is obscured.

Mental and Physical Growth of Individuals with Thyroid Deficiency

Occasional studies have reported correlations between intelligence and basal metabolic rate as high as 50 to 80,⁵ but the majority of studies have revealed low and insignificant correlations. All studies agree that if early diagnosis can be made and treatment instituted in the first year or two, the changes caused by the milder degrees of deficit can be reversed and a near-normal result produced. One study reports a near-normal outcome for two cretins treated from the age of 1½ years.⁶ On the other hand, the average gain in IQ for a group of 18 children, all treated prior to their fourth year and for an average duration of 3¾ years, was negligible (2.7 points).

* The term *basal metabolism* refers to a minimum rate of energy exchange required to maintain homeostasis in a resting state. The rate of energy transformation is calculated from the amount of oxygen consumed per unit of time in a test period after a night's rest and after the stomach has been empty 12-18 hours. Norms have been established for height and weight, and the record is usually expressed in percentage above or below these norms.

Personality Differences and the Thyroid Secretion

One interesting parallel between the experimental animal and man is found in the sensitivity to heat loss. Richter and Eckert observed that removal of the thyroid glands of rats set them to work covering their bodies with the nesting materials.⁷ Dr. Charles Mayo has observations on human subjects which show an interesting parallel. he found the hypothyroid patient to be typically slow in speech, slow in reactions, *sensitive to cold* (watching the radiators and the thermometer and wearing shawls and sweaters, and protesting at every draught from open window or door) ⁸ Another clinician reported a patient who drove about in a closed automobile in midsummer, dressed in heavy overcoat. Feeding as little as two grains of thyroid extract "thawed him out" and induced a feeling of warmth and well-being he had not known before.⁹

Other mental changes, accompanying extreme deviations in thyroid secretion, have been described by clinicians. The hypothyroid individual is described as suspicious, depressed, lacking in initiative, irritable, melancholy, forgetful, unable to concentrate, with slow (and even sing-song) speech. However, the consensus of psychiatric opinion would stress the fact that such a complex of traits is not the simple and direct product of glandular failure but rather that the lowering of vital reserves serves to bring out latent traits which have hitherto lain dormant in the personality. A mild degree of suspiciousness in the makeup of the person becomes exaggerated as the individual grows less capable of coping with interpersonal stresses, and may emerge as a more completely formed delusion of persecution. And the new life style may develop as a freshly-formed compensatory adjustment as the individual learns to husband his limited resources. Instead of meeting his stresses directly and liquidating his suspicions by direct actions, he may sit apathetically while his suspicions increase in dimension.¹⁰ It is doubtful, however, if the glandular deficit alone can determine the direction of the compensation.

The hyperthyroid is described as irritable, distractible, easily upset, with wide swings in mood. The hyperthyroid's "drive" is credited with diverse results. Dr. Crile, a well-known goiter specialist operating in the so-called "goiter belt," writes: "Pity the man who marries a hyperthyroid, for his nights will be filled with anguish and his days with remorse."¹¹ Stockard, on the other hand, thinks that these tall, lean, rapidly-growing, intelligent individuals are ideally fitted for a role of active, energetic, leadership.¹² Stockard believes that they are apt to be adventurous explorers, inventors, hewers

of new paths. These last characteristics suggest that even sober scientists have their rhapsodic moments. Such an evaluation of this glandular type seems on a par with the comments of the biologist who ventured into the field of sociology with an explanation for the rise of Hitler in terms of the sluggish submissiveness of the Bavarian peasant group, which is known to be prone to hypothyroidism in certain districts.

The truth seems to be that the glandular secretion affects metabolic rates, energy output, temperature regulation; and as these functions rise and fall there will occur gross changes in adaptation. The specific form of the adaptation at the high level will depend upon the totality of forces that have conspired to form the personality; and the hyperthyroid's performance may take the form of the poetry of Shelley, the voyages of Columbus, or the irascibility of the terrible Mr. Bang. The low-level output may find expression in uncomplicated dullness, apathy, or if combined with other factors it may facilitate an introverted withdrawal, a defensive and hostile (but covert) suspiciousness. The relations with the personality in general are not those of a simple part which determines a totality but of a part-function arising in a total setting. It acts as a multiplier, a catalyzer, affecting all reaction-systems and not just one pattern in particular. Conversely, there are undoubtedly reverse effects: the total life style may serve to exaggerate the glandular action—as when the hyperthyroidism occurs in the energetic but anxious personality makeup, and the stimulations from the sympathetic nervous system, which are an essential part of all emergency emotions, still further exaggerate the excess of glandular action. Here a vicious cycle can be set up, the gland exaggerating the anxiety and the emotional reactions activating the thyroid secretion.

Utilizing Horney's tri-dimensional scheme¹³ for analyzing abnormal interpersonal behavior, we could imagine the following triad of changes in the personalities of hypothyroid patients.

1. In the aggressive, self-assertive, vindictive makeup—where the main line of motion has been consistently *against* people—the thyroid loss would lead to compensatory hostile and suspicious behavior. The most available lines of action involve dominating, vindictive, destructive acts.

2. In the dependent one, already moving toward others and seeking solution to his problems through enlistment of aid, protection, love, the thyroid failure would intensify these claims and increase these needs.

3. In the withdrawn individual who has already taken the path of resignation as a means of lessening the conflicts too intense to bear, even more

of life would be surrendered as the role of serene and integrated spectator (the man without desires) takes over more and more of life

A single physiological occurrence, such as thyroid failure, produces changes in a system that has already developed coping and compensating mechanisms. It seems, therefore, that we must consider the self-in-action that is affected by these occurrences before we can speak of personality changes that are characteristic effects of specific glandular changes.

THE PITUITARY AND THE GONADS

Two endocrine glands (the pituitary and the gonads) are so closely linked in function, and so intimately involved in the process of maturing, that we shall discuss them together. The pituitary has been known as the growth-regulating gland since 1886. When certain striking cases of gigantism and dwarfism were tracked to their source it was found that the abnormal growth was caused by abnormal functioning of the anterior portion of a small spherical mass of cells, no larger than a good-sized pea (1.2 to 1.5 centimeters in diameter). Suspended in a bony pocket underneath the central portion of the brain, and joined by a slender stalk of tissue to the nervous centers in the hypothalamus,* the pituitary supplies the chemical regulators for at least a half-dozen bodily functions. In addition to regulating growth, the gland secretion stimulates the thyroid, gonads (ovaries and testes), adrenals, mammary glands, affects metabolism and regulates urinary output.¹⁴

* The hypothalamus, located at the base of the brain in the center of the head, is in close connection with all the incoming sensory streams from the receptors. As a nerve center it serves to integrate the automatic functions of respiration, circulation, and digestion, and it is often described as the head ganglion of the autonomic nervous system. Tumors, infections, injuries, which disturb these cells often produce disturbances similar to those bodily changes we associate with our emotions. Electrodes implanted in the hypothalamus of the cat, when made to stimulate these cells, produce a spasm of reactions which seem to be a fusion of fear and rage. They are called "pseudoaffective responses" because while they simulate emotions the responses differ from true emotional reactions in certain important respects. The fact that a cat so stimulated in the midst of a meal will promptly resume its contented eating when the stimulus ceases, although it had shown a blind spasm of activity during the course of stimulation, argues against calling these mechanically induced responses true emotions. The angered cat would remain disturbed for a longer interval.¹⁵ The close connection between pituitary and hypothalamus provides a functional linkage, however, between emotional and vitally important homeostatic mechanisms. Neural impulses from the hypothalamus influence the gland, and gland secretions act upon the adjacent hypothalamus cells.

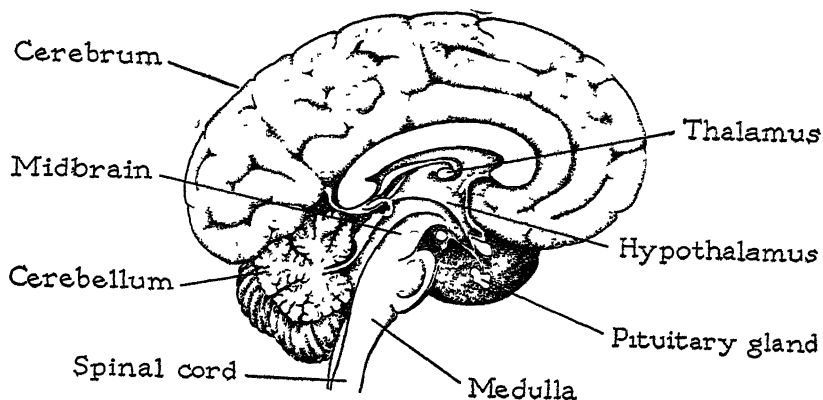


FIGURE 18. A view of the human brain in cross-section. Note the pituitary gland.

At present we are more certain of the range of pituitary functions than we are of the precise nature and number of chemical substances that mediate these functions, though biochemical research is rapidly making headway in identifying the active principles. Some of the work of the gland is stimulated by neural impulses which travel over the stalk connecting it with the hypothalamus, and some of its action is regulated by chemical agents in the blood with which the gland is richly supplied. There is a two-way exchange between ovarian cells and the pituitary, via the blood-stream, by means of which the oestrus cycle is regulated. The secretions of the pituitary also regulate the activity of the mammary glands in the nursing mother, and in return the suckling produces tactile stimuli which activate the pituitary via neural connections. In experimental animals whose spinal cords have been severed, such suckling does not maintain the pituitary substances that regulate milk-secretion if the nipples lie *below the cut*; but if some of the glands *above the cut* are stimulated by the suckling, *all* of the mammary glands will continue to secrete.¹⁶

A further illustration of sensory and neural control over pituitary secretion is found in the demonstrated effect of light on pituitary action. Experimenters have been able to advance or retard the onset of sexual activities, in animals that show seasonal variations in reproductive behavior, merely through an increase or decrease in the amount of illumination reaching the eyes. There is proof that the source of stimulation is optical, that the effect is mediated by the pituitary, and that the neural tissue joining the hypothalamus with the pituitary must be intact. The onset of sexual responsiveness

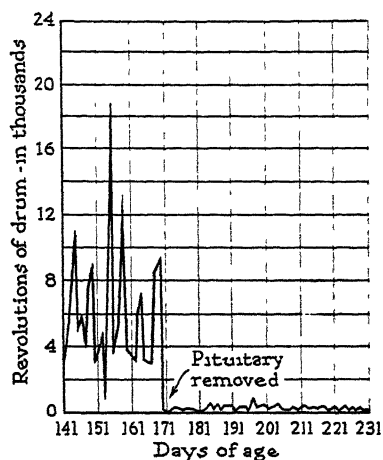


FIGURE 19 Gigantism of pituitary origin. Early and persistent over-secretion of the growth hormone produces gigantism. The glandular hyperfunction may be accompanied by an actual deficiency of the gonad-stimulating hormone, particularly in the later stages, and an underactivity of the reproductive system is noted. Some endocrinologists have suggested that the secondary atrophy of the sex glands, the functioning of which normally serves to arrest the growth spurt, is responsible for the continuation of growth beyond puberty in this case. If the over-secretion of the pituitary occurs after mature growth has been achieved, a distorted growth of the extremities and internal organs (especially the liver) results. This latter condition is known as *acromegaly*. Personality changes have been reported in these patients. While some of these (sluggishness, apathy, drowsiness) may be due to the direct failure of the glandular secretion, others are probably indirect in their development and depend upon the person's reaction to his changed and unattractive appearance (enlarged arms, hands, feet, coarsened features, thickened lips, and the like). [Photo from H. A. Atwell.]

with the lengthening days of spring involves the following sequence: increasing illumination of the retina, action of optical relays in the brain stem, neural activation of the pituitary, release of gonadotropic hormones which activate reproductive structures and initiate mating behavior.

The poultryman's use of increased illumination to stimulate egg-laying in winter is a practical illustration of a similar cycle of events. Anatomical studies have shown changes in size of the pituitary and testes (sometimes by as much as 2000 per cent) in birds following increased illumination. Some investigators have succeeded in linking the onset of migratory activities in certain species with the internal changes arising from this type of externally initiated gonadal changes. The ferret, fieldmouse, hedgehog, have shown this visual-pituitary-gonad linkage.¹⁷

FIGURE 20. Drop in activity of a rat (as measured in a revolving drum) following removal of the pituitary gland. [From C P Richter, *American Journal of Orthopsychiatry*, 2 (1932), p. 347.]



The Acceleration of Maturation

The burst of growth and the increase of size and secretory activity of the reproductive glands which we associate with adolescence are matters of pituitary action. Timed by the genes, in the first instance, the pituitary serves as the final executor in regulating the developmental schedule. Experimental acceleration of pubescence can be induced by injections of the anterior pituitary hormone. Removal of the gland causes a slowing of growth, dwarfism, and a marked decline in activity (see Figure 20). Experimental animals tend to remain infantile in bodily form.

In experimental animals, injections of pituitary hormones produce changes in behavior that are as pronounced as the structural transformations. Accompanying the growth spurt, which results in altered bodily proportions and the maturing of sexual organs, new activities emerge: males and females act as sexually mature animals. For example, copulatory behavior does not ordinarily appear in the albino rat before the 40th day, but if glandular injections are begun on the 22nd day the male may show the complete adult pattern within a week. This acceleration of pubescence can be brought about directly by the injections of the sexual hormone, or indirectly by the injection of the anterior pituitary hormone.*

* An attempt to induce maturation in an undeveloped adult human subject was reported by Hamilton in 1937. A 27-year-old medical student complained of headache and many mental symptoms. His bodily status was that of an individual castrated before puberty and he was sexually impotent. Physical and mental virility was induced by injections of the male hormone. During the course of treatment these injections were replaced by injections of an inert substance without the knowledge of the subject. The patient then reported an immediate return of his pre-injection status.¹⁸

Male chicks, reared in isolation, and treated with injections of the male hormone will show the complete adult copulatory pattern as early as the 15th day after hatching, thereby demonstrating *for this animal* that (1) the factor of conditioning is relatively unimportant, and (2) the sensori-motor patterns involved in mating are matured prior to their normal functioning period, and (3) the hormone acts as a *sensitizer* of these arcs.¹⁹ It does not follow, however, that experience can have no effect upon such patterns. The evidence shows, on the contrary, that such "instinctive" acts can become attached to new and unusual stimuli, that the pre-pubescent habits may delay or completely inhibit the appearance of the patterns.

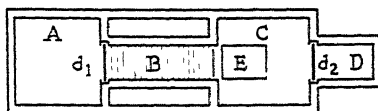
Experimental Modification of Instinctive Patterns

The studies of Jenkins and Beach show that pre-pubescent experience can alter the behavior of the mature albino rat. Jenkins measured the strength of the sex drive in his animals by using the obstruction-box technique.²⁰ (See Figure 21.) In this procedure the male is separated from the sexually receptive female by a charged grid. If the animal attempts to cross to the incentive his contact with the grid supplies a shock. A medium intensity of current is used so that, while the shock provides a barrier, some crossings will still be made. When the appropriate intensity has been determined empirically for the species, a quantitative estimate of the strength of any motivating condition can be made in the form of the number of contacts and crossings per unit of time. Jenkins segregated males prior to 30 days of age and showed that when tested at 185 days the incentive value of the receptive female had been lowered, when comparisons were made with unsegregated males. In his segregated male group more crossings were made to gain access to a male, the kind of stimulus object to which they had been habituated. A comparable preference for an incentive animal of the same sex was shown in segregated females.

Beach divided fifty-five 21-day-old males, just weaned, into three experimental groups: (1) 22 were completely isolated from all contact with other animals until the tests were given; (2) 17 were segregated until 40 days of age, at which time sterile but sexually active females were introduced to the living cages, and (3) 16 were segregated in one large cage until tested. The tests were made at 100-110 days of age. Following a 15 minute

¹⁹ The term *instinctive* here refers to those patterns of response whose appearance is normally guaranteed by the maturing process, in which the environment supplies the raw materials (chemicals, physical conditions) but does not "teach" the pattern.

FIGURE 21. Obstruction box (Columbia University design) The animal to be tested is placed in compartment A, and the door d_1 , is raised. In order to enter compartment C (and to cross the release plate E, which operates the door d_2) the animal must cross an electrically charged grid in compartment B. When d_2 is opened, the animal can reach the incentive stimulus in D



period of adaptation to the observation cage a receptive female was introduced. A maximum of 15 minutes elapsed before the animal was returned to his quarters. Within the first seven periods of observation 69 per cent of the isolated males, 53 per cent of the cohabiting males, and but 25 per cent of the segregated males showed the copulatory pattern. More than half of the isolated animals had shown the pattern within the first 15-minute period.²¹

Whitman, Craig, and others had reported comparable observations on the pigeon.²² In this case a male passenger pigeon, reared with ringdoves, mated with ringdoves. Normally such cross-species choices do not occur. In this case the male could *not* be induced to mate with his own kind. Even depriving him of all contact with ringdoves for a season did not alter his prejudices, in this case directed against the normal stimulus object for the instinctual pattern. One mourning dove kept in Whitman's laboratory during the winter, directed courtship behavior toward the experimenter, manifesting an aggressive jealousy toward a female of his own species instead of the normal sexual pattern. (Craig has reported a parallel instance.²³) His responses to the female were so savage that the birds had to be separated. In one case the mating behavior of the male was directed toward an old shoe; while in another case mating behavior was directed toward the hand of the experimenter.

The speed with which sexual behavior matures under the action of pituitary and gonadal hormones suggests that the requisite neural organization is already complete, and that the chemical agencies act as sensitizers of action systems already prepared and organized under the control of genetic factors. In one experiment male albino rats, castrated at 21 days, were later treated with injections of the *female* sex hormone. Their behavior was predominantly *male* in form; the sensitizer, acting upon action systems that were genetically male, failed to reverse the previously organized action patterns.²⁴

Gynandromorphs

The case for such neural (and ultimately genetic) determination of the reproductive patterns is especially strong in the case of insects. The case of the gynandromorphs presents an interesting experiment of nature in this connection. In the normal animal the joint action of many factors, neural, glandular, experiential, makes the unravelling of the determining agencies difficult. In the freakish, bisexual gynander the factors are isolated for us. A gynander is partly male and partly female. It is literally a sexual mosaic. The division line is usually along the midline, less commonly between the head and abdomen. Arising from an egg nature designed for a female, some of the cells lose the constituents that determine femaleness. If this loss occurs at the first cell division, and affects *one* of the cells, this cell (now male) will give rise to a male half of the insect while the other daughter-cell will produce a female half.²⁵ Other more complex forms of gynanders are produced by similar losses at later stages of development.

In the wasps studied by Whiting and Winstrup each sex has its characteristic antennae, eyes, wings, coloring (in addition to the specific differences in reproductive structures) so that the maleness or femaleness of a bodily segment could easily be determined. When the head is male and the abdomen is female (and when the reproductive organs are therefore female) the insect attempts to mate with females, shows no interest in caterpillars, and does not feed on them or lay eggs. When the head is female and the abdomen male the insect attempts, in spite of its structural deficits, to sting caterpillars and to lay eggs. In 52 gynanders observed, only 6 showed behavior in which actions conformed to the reproductive organs, and in these cases both heads and abdomen were bisexual. Although it seems probable that the head-structures that are regulative of the patterns are sensori-motor (neural) the present study offers no proof that this is so. We know too little about the endocrine factors in this case. The probability for the neural control is strong, and the evidence is strongly against any peripheral controls arising from the reproductive system itself.

Sex Reversals

From the beginning, when we learned that the hen of the domestic fowl could be converted into a comb-bearing, crowing, hen-treading, pseudo-male by operative procedures which removed the ovaries and replaced their secretions either by grafts of testicular tissue or by injections of the male hormone, investigators have sought evidence for other cases of sex reversal. Canaries, mice, rats, guinea pigs, monkeys, have been subjected to this type

of test. Sex reversals cannot be produced in all forms. Where they are most complete there is evidence of a pre-existing bisexuality. For example, the male toad (*Bufo americanus*) normally possesses rudimentary ovaries. When the testes are removed these ovarian tissues grow, and other reproductive structures change in form and function. Although the creature is genetically a male, it now behaves as a female, fully assuming the reversed sexual role. In this case we might more properly call the young toad neutral since he can be so easily driven toward either one of two divergent developmental goals through this interference with hormonal secretions. Lowering the temperature has been found to produce a differential action on the developmental process, also, causing the eggs of frogs and toads to develop in the female direction, suppressing testicular growth. High temperatures produce a preponderance of males.²⁶ A similar, though not complete equipotentiality for growth and behavior exists in the domestic fowl. In the latter case, treating normal hens with androgens induces crowing, strutting, fighting, but the reversal is incomplete.

The rat, so widely used in these studies of sexual behavior, portrays no such bisexuality in its structure, and we have seen that even when reared in isolation the reproductive pattern characteristic of its sex appears at the appropriate stage of its maturation, *but this pattern is not the only one that appears*. A young male, particularly if sexually excited and pursued by a larger and equally aroused male, sometimes takes the female posture and permits the other male to mount him. Pairs of male monkeys behave in the same way, and it is easy for the observer to imagine that the younger animal utilizes this "presentation posture" as a means of diverting and distracting a dominant and aggressive male. Evidence seems to indicate that the specificity of sexual behavior varies with the level of excitement: under hormone injections, which raise the level of excitability, or under isolation and deprivation, the frequency of the homosexual pattern increases in both males and females.²⁷ Coupled with this bisexuality in behavior is the further fact that the endocrine organs of each sex produce two sets of hormones. In the male animal the female hormone (estrogen) is normally present in small amounts, and in the female animal the male hormone (androgen) is present in small amounts. (See Nathanson's curves for male and female adolescents [human] shown in Figure 22, page 146.) It would be a tempting theory to explain the dominance of the masculine pattern in the normal male as due to the dominance of the male hormone. Early experiments reported results which at first appeared to fit into this formulation. Injections of estrogen, for example, into prepubertally castrated male rats do increase the frequency of the "passive" female responses to pursuing males. But

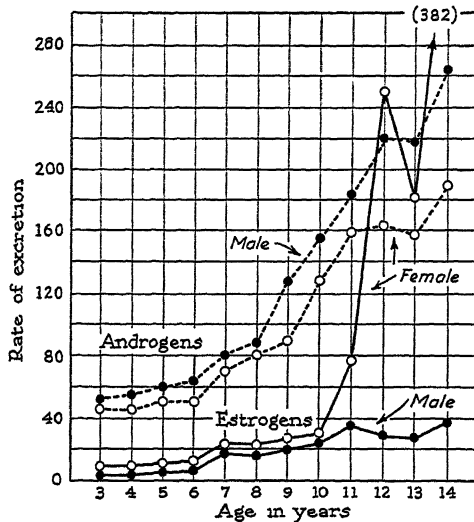


FIGURE 22 Age changes in excretion of sex hormones [From I T Nathanson, L E Towne; and J Aub, "Normal Excretion of Sex Hormones in Childhood," *Endocrinology*, 28 (1941), pp. 851-865]

they also increase the frequency of heterosexual responses. Careful study of the order of preference of incentive objects and the relative dominance of masculine over feminine postures seems to indicate that in the rat no true *sex reversal* is brought about. Both hormones appear to increase sexual excitability, and with this change there is a greater likelihood that the less-frequent, atypical patterns will emerge. This explains the apparent reversals obtained in earlier studies. The fact that the genetic type persists even in the prepubertally castrated male indicates that the hormone is not the organizer of the pattern.

Sex reversal in man Clinical literature of recent years has contained numerous reports of attempts to treat the homosexual with glandular products. The procedure is founded upon the same lines of reasoning that has guided many of the investigators in the animal field—namely, that since both hormones are known to be present in both sexes, and since normally the androgen is dominant in the male, may it not be that the male homosexual is basically a case of estrogen dominance and may it not be possible to reverse the dominance of estrogens by testosterone injections? Inviting though the theory is in its simplicity, the clinical evidence does not support it. In the first place assays of blood and urine have failed to substantiate the hypothesis of estrogen dominance in the male homosexual²⁸ and the indicated treatment has not brought about the hoped for results. The cases of bisexuals²⁹ whose behavior alternates between the two patterns (and some-

times within a few hours) offer a difficult problem for those who would explain the choice of a sex object on the basis of the *dominance* of one of the hormones. And there are clinical cases in which the endocrines produce a progressive masculinization (in the female) in secondary sexual characteristics without any corresponding changes in mental outlook or desires. It appears, therefore, that the data on human subjects (as well as those on rat and insect) argue against an endocrine determination of the precise pattern of sexual behavior. If the neural pattern is too fixed in the insect, it is too plastic in man.

Contrasts between Lower and Higher Forms

In the lower forms of animal life two differences are worth emphasis. (1) there is a greater degree of stereotypy of behavior, and (2) the process of maturation prepares the way for the appearance of complete patterns which, in the higher forms, require the shaping impact of experience. Even in as humble a form as the rat this experience can overlay and modify the innate equipment, but barring such distorting action in the course of training, growth brings the complete pattern to fruition. In the chimpanzee and man experience plays a more important role, and the development of mature behavior is a gradual one. The sensori-motor elements of which the mature responses are built appear early in prepubertal life, yet observers agree that the first attempts of mature animals to copulate indicate much clumsiness and lack of organization of behavior, especially in the male. When the part-reactions appear in the prepubescent play of anthropoids they seem to have little, if any, sexual significance; and when biological maturity is achieved and the occasion (with attendant physiological readiness) is suddenly at hand, these earlier assemblages of action-systems do not organize themselves suddenly around the new biological drive. In the higher anthropoids, at least, experience has to shape expectancies.³⁰ Stone's summary of this point deserves quotation.

"These observations on primates and primitive peoples suggest that few, if any, of the elementary acts of *primate* courtship or the preparatory acts leading to copulation appear absolutely *de novo* and in a saltatory manner at the time of somatic sexual maturity, as oft times appears to be the case among the lower animals. It is conceded, however, that during the prepubertal as opposed to the post-pubertal years, sexual acts appear infrequently, are usually not persistent and vigorous, may easily be supplanted by other

incompatible activities, and can be held in leash with relative ease by simple social or mechanical barriers ”*²

Studies of young human adults have shown that in interviews with males 35 per cent or more report having had homosexual experience Since clinicians agree that the percentage that stabilizes at the homosexual stage is finally somewhere between 3 and 4 per cent of the population, the higher values indicate a considerable range of experimentation in the formative years ³¹ Upon the basis of his interviews Kinsey concludes that 18 per cent of males have at least as much of the homosexual as the heterosexual in their histories for at least 3 years between 16 and 55; and 13 per cent have more of the homosexual for a similar period ³²

Pubertal Changes and Adolescent Interests

Three studies of the human adolescent may serve to illustrate how some of the notions we have been discussing have affected our notions of human maturing These studies form a point of convergence for four lines of thought:

1. Both standardized tests and common experience inform us of changes in behavior and outlook in the adolescent years
2. Growth studies have impressed us with individual differences in rate of maturing.
3. Animal studies have indicated that the hormones are pace-setters, and under hormone influences heterosexual interests can be accelerated even where experimental isolation eliminates educative heterosexual contacts
4. Clinical evidence indicates that hormones operate as sensitizers in human adults.

The present studies raise this question “Do the physical growth factors set the pace for the development of characteristic adolescent interests, or are these dependent upon an age-graded training which the culture controls?” The proportionately larger role played by experience in the case of the higher primates has left this question open.

Sollenberger studied a group of adolescent boys, using a chemical assay of 24-hour samples of urine as a means of estimating the degree of physical maturity ³³ Ratings on this physical measure were correlated with two meas-

* C P. Stone “Sex Drive,” Chapter 23 in Edgar Allen (ed.), *Sex and Internal Secretions*, Second Edition (The Williams & Wilkins Company, 1942), p 1222 Used by permission.

ures of performance. (1) estimates of counsellors as to maturity* and (2) scores on an age-graded interest questionnaire (Furfey Test) which had been previously standardized by other investigators. The correlations obtained indicated that biological maturity was more closely related to the pattern of interests than was chronological age.

Rank-Order Correlations between Hormone Output, Chronological Age, Behavior Ratings, and Scores on a Standardized Interest Test

	CHRONOLOGICAL AGE	BEHAVIOR RANK	FURFEY SCORE
HORMONE ACTIVITY	28	90	.65
CHRONOLOGICAL AGE		06	-.24
BEHAVIOR RANK			.57

The ratings on maturity of behavior were composite scores based on (1) reactions to frustration, (2) heterosexual interests, and (3) maturity of interests. A second observer, rating the boys on the basis of a somewhat subjective and unanalyzed concept of general maturity, gave rankings that correlated .86 with the experimenter's rating. The boys lived in a cottage with the investigator, who served as house parent. The final behavior rank used in computing correlations was constructed by combining the estimates of the two observers. The low relationship between hormone activity (28) and chronological age would be produced by two factors, the variations in rate of maturing and the fact that measures were made at the critical age level when sharp changes in hormone output occur. The low relationship between chronological age and behavior rank (.06) and the very high relationship between hormone activity and behavior rank (.90) indicate that maturity of behavior is a matter of endocrine status rather than of age. The standardized test (Furfey) did not prove to yield as high correlations as the rough observation, but the trend indicates a similar relative importance of the endocrine status.

An examination of the items of the Furfey test chosen by the more mature boys reveals something of the nature of the contrast between mature and immature groups. A selection of the items in which the greatest difference between the "low hormone" and "high hormone" groups were found is given on page 150.

The list as a whole suggests that the mature group was interested in personal adornment, strenuous activities, realistic (in contrast with imaginative) activities, heterosexual activities, to a greater degree than the immature group.

A second study, by Stone and Barker, shows a similar maturing of interests in adolescent girls. When the girls were divided into pre-menarcheal

Items from the Furfey Test, Showing Differences between Mature and Less Mature Groups

ITEMS USUALLY CHOSEN BY THE OLDER, 'HIGH-HORMONE' GROUP	ITEMS USUALLY CHOSEN BY THE YOUNGER, "LOW-HORMONE" GROUP
<i>Which would you rather do?</i>	
Read novels Listen to a band playing Go out with a girl Drive an auto Go to a dance	Play follow the leader Make candy Play with Meccano Go to Scout meetings Chew gum
<i>Which would you rather be when you grow up?</i>	
An author A knight	A mail carrier A priest or minister
<i>Which would you rather have?</i>	
Some handkerchiefs A set of golf clubs A book of adventure stories A travelling bag	A set of toy soldiers A cowboy suit A pair of rubber gloves A water pistol
<i>Which would you rather see?</i>	
A beautiful sunset A diving exhibition A fancy dress ball	A fairy prince A stage coach Santa Claus
<i>Which would you rather think about?</i>	
Famous athletes Going travelling Getting a job	Boy Scouts Wild animals The days when knights lived

and post-menarcheal groups, equated for chronological age, the former were shown to be less mature in terms of answers to questions of the general type used by Sollenberger. The difference in maturity of interests amounted to eleven months according to the norms of the general population. Like the more mature adolescent boys, the post-menarcheal girls showed more interest in personal adornment, in the opposite sex, in social events in which boys participated. Unlike the boys, the more mature girls were more interested in daydreaming, in imaginative activities, in less strenuous games. The investigators had endeavored to equate the groups in social, economic, racial (and national) backgrounds and are therefore inclined to attribute the differences in expressed interest to the growth factor.³⁴

These correlations between interests and endocrine status demonstrate the gross facts correctly; but many unanswered questions arise when we look at the data more closely. Is the shift in interest an immediate and automatic thing, as it is with the chick and the rat? Is it a more indirect process in which the individual reacts to the changes in his own body by an imitative identification with adults and adult ways, or is it even more indirect, depending upon the adult identification of the changes and the adult acceptance of the maturing youngster into more mature circles? Is the pattern of interest at puberty due to the cumulative effect of training influences—which normally prepare the way for the shift of interest but occasionally block such a shift—with the external and cultural factors normally shaping the adult pattern, the endocrine changes merely timing its appearance? Before we lay the burden completely upon the tidal forces of growth, certain aspects of the problem are worth brief consideration.

1. The comparison of groups overlooks widespread individual variations. Many post-menarcheal girls retain the pre-adolescent pattern of interest in some or even in the majority of the areas sampled. There is much overlapping in the gross total scores, and even more in the scores for single items.

2. The post-menarcheal girls are also more intelligent and have a slightly higher scholastic aptitude. These factors would throw them in contact with older girls, on the basis of grade placement alone, hence the maturing of heterosexual interests would reflect age-graded cultural patterns.

3. An a priori classification of test items does not always provide a basis for predicting responses. For example, selecting all pairs of items that differentiate on the basis of heterosexual interest, there are 18 that succeed and two that operate in the reverse direction (that is, the mature girls show

less heterosexual interest than the pre-menarcheal girls). The reasons for the exceptions are obscure

4. The exceptional cases (3-4 per cent) who never show the mature pattern of interest in spite of normal physical maturation warn us that there are other factors that must be considered. Dr. Helene Deutsch observes that many girls enter what might be called "psychological puberty" prior to their first menstruation, and conversely many girls are physically mature but "psychologically" immature ³⁵

Involucional Changes

The bodily changes, both structural and functional, that occur at the climacteric are as noteworthy as those that occur at adolescence. Students of development have given them less attention than they deserve. We can indicate here certain gross changes which the study of the pathological extremes reveals

Certain women react to the process of ageing with a marked feeling of depression, a marked retardation of bodily functions. When these reactions appear rather abruptly in the age-period of 45 to 55, and particularly where the life situation seems to give little basis for the extreme depression and sense of failure and guilt, the diagnosis of involucional melancholia is given. These patients feel the loss of their physical attractiveness very keenly, seeming to fear a loss of love, and regarding themselves as useless, unworthy. They mourn lost opportunities for personal growth and pleasure.

The drop in hormone output with the menopause, the commonly reported loss of sexual appetite, and the well-known relations of the level of activity and bodily vigor to the endocrine output (see page 141) suggest a simple hypothesis. However, intensive study of these cases reveals that the relations are by no means so simple. For one thing the onset of these depressive reactions does not coincide with the cessation of the menses. In a study of 38 women, diagnosed as cases of involucional melancholia, investigators reported that in 17 of the cases the menopause occurred from one to eight years prior to the onset of the present illness, and in one it occurred considerably later. In half of the cases there was a synchronous development. The routine use of hormone administration did *not* restore these patients to normality.³⁶ Although there is a widespread use of endocrine products to relieve the physical symptoms of the menopause, it does not provide any magical solution for those who have found the readjustment to an ageing physical status a difficult one. (Careful control studies call into question the value of hormones for the relief of physical symptoms ³⁷)

Cessation of sexual desire and decline in capacity for marital relations are accepted as common accompaniments of the menopause; but again there are wide differences. The effect of decline in hormone output may be delayed for years. Medical literature reports human castrates who have retained capacity for coitus for 10 years after the castration. Experimental study of animals shows that the effect of castration upon the pubescent animal who has not established the pattern is profound, but the adult castrate who has established the pattern prior to the operation tends to retain the pattern in spite of hormonal deficiency. Though the endocrines appear to be sensitizers and pace-setters it would appear that the type of heterosexual experience of the mature individual does something in the way of building in or inhibiting action-systems which may persist after the hormonal sensitizers decline.

It is also apparent that many factors converge to make the readjustment of the ageing woman difficult. Her sense of having made a failure of her life, of being useless, finished, used up, is sometimes related to the fact that she has been all too devoted to her children who have now grown and departed. Having invested so much of her life and energy in them, she now finds her hands empty. The career she once might have pursued is now closed to her; and she feels that her cleverness and her skills have been dissipated in the thousand tasks of her household routine. And now she lacks the energy to embark upon a new style of living. To neglect this total context in our pre-occupation with the chemical regulators of growth and energy-output would be a serious error.

The ageing of the male is a slower process, the changes less dramatic. With a wider anchorage outside the family, the organization of his life is often better prepared to resist the changes that occur in this period, but he, too, faces competition with young aggressive males at a time when his own ageing system supplies less energy, and he may face retirement at the end of a narrow and intense career that has developed too few psychological assets. Being "put on the shelf" may fill him with a sense of uselessness and utter failure; and being displaced by the men he has helped to develop and train may fill him with bitterness at their ingratitude, with a hostility that does not help his blood pressure.

These sketchy observations may serve to indicate that it is a whole life style that must be considered, a whole social pattern, as well as the chemical aspects of ageing. Neither can be omitted.

INTERRELATEDNESS OF GROWTH

Our sketch of growth has been both fragmentary and abstract. It has shown a few major trends and many exceptions and inconsistencies. It has examined growth as a maturing process in nerve fibers, as a series of endocrine-incited and somewhat saltatory changes in structure, and it has considered social and environmental factors which accelerate and retard both physical and intellectual growth. The process of analysis and abstraction, so necessary for exposition and experimentation, gives us everything but the sense of that individual-as-a-whole who is doing the growing and developing. As they exist, in the flesh, growth processes occur in children, rather than in organs, and they occur in a family constellation, with parental aspirations, loves, rejections, rather than in some abstract psychological or sociological category. There is also a constant interplay between part-processes and persons, between the individual-as-a-whole and his developing organ-systems, between the child and his matrix. Our analytic procedures have scarcely permitted us to glimpse the richness and diversity of this total process.

There is a quality about the totality we call the person that we lose as we analyze, even as we lose the onion when we peel off layer after layer. The sense of this loss leads some psychologists and many laymen to react against all mechanistic, statistical, and physiological accounts of human behavior and to attempt to recapture the sense of the whole person. At their worst, some of their writings contain more enthusiasm than clarity. At their best, they convey an intuitive knowledge which is closer to the understanding of the artist—the novelist, the biographer, the portrait-painter—than it is to that of the anatomist, the experimenter.

The clinician has to work somewhere between the artist and the experimentalist. He needs the analytic power of the experimentalist in order to break down the all-too-complex totality of the person into manipulable and understandable bits which he can treat. Yet he should not attempt to change a part without anticipating the effect upon the whole, and he cannot successfully heal organs when the personal-social matrix is shot through with unhealthy and disharmonious relationships. Since his ultimate goal must be the health of the integrated totality, the person, he must also possess the creative gifts of the artist.

For this reason it will help us, before concluding this phase of our discussion of growth, to turn to one or two clinical discussions. In some small degree the awareness of interrelationships has already been hinted at, through

this channel. We noted that a husband's mental illness affected the weight of a developing fetus, that dietary habits may accelerate or retard puberty, that a mother's poverty in childhood may later contribute to her son's obesity, that emotional upsets may influence bone growth, and that hormones may affect the attitudes and interests of adolescents. If any general axiom has emerged, it might well be stated as: "Always consider the organ, the part, the aspect, in the light of the entire process of adjustment between the individual and his matrix." Since our task is constantly an analytic one, perhaps we can afford to neglect the companion axiom: "The individual as a whole can only be understood and altered by a person who can make an intensive analysis of the way in which the parts are behaving within this integrated totality."

THE CASE OF SHORTY³⁸ Shorty appeared at the Institute for Child Study at Oakland as one of a number of children who were being followed over a seven-year period. As his name implies he was short and stocky. In addition, his rate of growth was slow; and although he was quite unconscious of this at the start it finally became the central factor in his development. Shorty had always been a bundle of energy; even as a small tot he would disappear for the day, wandering down to the wharfs or railroad yards, sometimes getting lost in his absorption with noise, machines, motion. At eleven he was spending his out-of-school hours at a busy intersection, selling papers, hopping on the running boards of passing cars, relishing the traffic, the banter, the give and take scuffles with the other boys. His frank friendliness made him one of the most popular boys of his grade, and whenever a group gathered Shorty would be in the center of it, full of suggestions. This was more apt to be true when things were in a disorganized phase, when they settled down to more organized activities Shorty was less in evidence. When he came to the clinic, at the beginning of the study, there was little that was noteworthy save possibly his high metabolic rate and a slight boisterousness and mischievousness that threatened to disrupt the institute. His intelligence was above average (IQ 128) and his school work was passable, although Shorty was always more interested in activity than in the steady application of effort.

It was really not until senior high school that Shorty's difficulties were precipitated, although there had been a steadily mounting disparity between his development and that of his peers. The youngsters in the high-school club rooms began to make disparaging remarks about his personal appearance (which had not hitherto bothered them) and his rowdiness and clowning now annoyed them. While his pals were shooting up inches

in height and their voices and other secondary sex characteristics were changing into those of young men, Shorty remained the little boy. At the clinic he stretched upward, when his height record was taken, visibly attempting to make a better record, and he inquired of the physician whether there was not some medicine that he could take to grow tall. In the gym he took to hanging from the bars, hoping to stretch out his inadequate stature. He found that he was not chosen for games, that he could not compete physically (and this was the field where he had excelled). Worst of all, while he remained—like most pre-adolescents—interested mainly in masculine companionship, his pals “went soft,” hung around the dance floor where the girls danced to the music of the victrola. While they spruced up in appearance, danced, dated, played kissing games, Shorty remained the small boy whose imagination prompted him to shut off the victrola, steal the ice-cream at the party, interrupt the more adult atmosphere with pathetic clowning. Shorty was not wanted.

At home he became difficult, morose, quarrelsome. A sullen aloofness replaced his frankness. His school work declined. Then there was a brief period in which a “jalopy” assembled from junk-yard parts took all of his interests; but aside from his discovery of two cronies who shared in this project his social adjustment did not improve. An episode of teasing and hazing in the shop, in which his lack of masculine development played a central part, precipitated a state that almost bordered on the psychotic. He accused his shop-mates of stealing the key to his car, called the police who, in turn, accused Shorty of being the ringleader in some serious thieving then going on. He was taken to a detention home, and in his frantic resentment at the false accusations and misunderstandings behaved in such a fashion that he was diagnosed as schizophrenic. An intelligence test administered at this time classified him as of borderline intelligence (IQ 72).

Rescued by an understanding counsellor, Shorty was put on a new schedule of work, made into an athletic manager (which utilized many of his talents and provided a substitute satisfaction for his frustrated ambitions). His long-delayed growth carried him (at 15) into the adulthood too long postponed, and with a little better insight into his own needs and with new heterosexual interests that carried him back into group life, Shorty became an average adolescent.

In the story of Shorty we can see in personal form what would otherwise remain a statistical item in a chart of growth indices. To describe him as in the lower quartile in stature does not adequately indicate what this lag in growth can mean to an active boy who has the human desire to be popular. There was nothing wrong with Shorty's growth except that

he was "out of phase" both intellectually and physically. placed with his intellectual peers he was physically and socially retarded, placed with his physical peers he would have been bored intellectually. While Shorty could not analyze his difficulties, he could *feel* them, and the violence of his rejection of his role was enough to convince one examining physician that his intelligence was deficient and that he was bordering upon a psychosis.

THE GIRL WHO WOULD NOT EAT Anorexia nervosa (nervous loss of appetite) is a clinical diagnosis which is most frequently applied to young women in their late teens and early twenties. When the dynamics of the illness are studied we find another illustration of the interpenetration of biological, psychological, and social factors. Although it is the self-starvation that brings the girl to the clinic, there is usually an antecedent psycho-social groundwork which might be described as a loss of appetite for life. Sometimes the chief factor is a veritable refusal to grow up, a rejection of the role of womanhood, a fear of physical maturity. These latter factors are clearly important in the following case ³⁹

The case enters the hospital A young woman 17 years of age, just graduated from high school, was referred to the psychiatric service of a large city hospital because of her excessive dieting. Over a two-year period her weight had dropped from 157 to 92 pounds. Menses had stopped. As a climax to a period of tension in which she had shown temper tantrums of increasing severity, she had demanded poison in order to end it all.

Earlier history Adolescent growth had been normal. Menses had begun at thirteen, and height and weight had been within normal limits. Instead of following the common pattern of youngsters of her own age, however, she withdrew to herself, spoke of her schoolmates as "cigarette smoking tramps," avoided social activities, stayed at home reading books, munching candies and cookies, and grew fat. Her teachers and schoolmates, as well as her family, commented on her plumpness, and her brother, who thought she was "disgustingly healthy," called her "the heifer."

Relationships with father At this time her father showed considerable concern over his maturing daughter, although not for the reasons that would have alarmed a psychiatrist. He spoke and acted as though he wanted her to remain a child, inviting her to sit on his knee, shopping for her in the stores instead of teaching her to choose her own garments. And he not only hinted darkly at the sexual dangers that threatened from

boys and men, he actually gave up his job on the police force so that he could be free to drive her to and from school each day. Although he was but 52 years of age, this hearty but moralistic Irishman retired from active duty to live upon his pension and to devote himself to his daughter.

Precipitating factors Into this mental maelstrom created by the events of adolescence and the parental overconcern, certain events entered to act as precipitating factors. When she was 15 a girl in her class had to leave school because of pregnancy. Shortly afterward a boy behind her in class reached forward and touched her breasts. About this time she became preoccupied with the fantasy that she was pregnant. (Why this should crystallize into a conviction that was strong enough to guide her actions is difficult to say. Perhaps her ignorance in this sphere made it easy for her fancy to run unchecked; and perhaps her ignorance of the facts of life combined with her father's dark hints and her classmate's delinquency to create the pregnancy fantasy. Her own changing bodily states must have also helped to shape this combination of guilty wishes and fears.)

The dieting begins Without any clearly formulated chain of reasoning, out of this compound of fear, revulsion, and guilt (and possibly a poorly conceived attempt to punish herself and to master her own cravings) she began to diet. Her own rounded contours, caused by her too generous appetite and her inactive mode of living, helped to shape her determination. It is even conceivable that pregnancy may have been unconsciously equated in her mind with her guilt in overeating. Women with a strong pride in their slim, boyish figures have been known to look with contempt upon their plumper sisters who look pregnant even when they are not. At any rate her dieting was determined enough to reduce her weight from 157 to 130 pounds within a year; and the change in her nutritional status was pronounced enough to bring about a cessation of menstruation (see page 130).

Whether from delight at this victory over her desires, or from new and (to her) unknown motivations, her concern over foods and dieting increased. She read books on nutrition, avoided all fattening foods, ate less and less, accused her parents of putting something in her food to increase her appetite, and absolutely refused the tonic prescribed by the family physician. She grew imperious and demanding in matters of diet; and lest the little she did eat might be deposited as fat, she forced herself into ceaseless activity. She grew increasingly irritable, and her actions became compulsive. She had to have the doors fully open, or fully closed; she had

to touch the hangings and certain spots on the floor, and if anything she read reminded her remotely of fat she would dig her nails into the page at such words

The patient as a child The girl's mother recalled that she had been breast fed, as an infant, for six months, and weaned with difficulty. There had been some evidence of night terrors, even up to the age of her hospitalization. At the age of six she had been extremely fearful of the dark, and had had the not uncommon childish compulsions of fear of stepping on cracks. She had been afraid that gas would escape from the cookstove, that the house would explode. When, at the age of 12, she saw her father's brother carried from the house she had a "premonition" that he would die at the doctor's office and never return; and when this proved to be the case she had the guilty feeling that her thoughts had somehow contributed to his death. And later she feared that this magical power of hers would cause her mother's death. When this latter thought overwhelmed her it was usually succeeded by the thought that she must commit suicide. We can almost follow the obscure thread of some mother-daughter conflict in which repressed hatred and death wishes were swiftly followed by overwhelming guilt. The crowning demands for poison which preceded her hospitalization must have fitted into this latter pattern; but like so many of our acts a dozen factors were undoubtedly conspiring to produce the one result. Although her fears and compulsions were not extreme, they gave evidence of a certain stubborn and obsessive streak in her personality; and when we learn that she dominated her older brother, and by means of her night terrors forced her mother to sleep with her (while her father was forced to take a room alone) we sense a strong will in her makeup. Turned to better objectives these forces would have made her "a girl of character."

Behavior in hospital After two months in hospital, during which she gained 17 pounds, menstruation returned. Endocrine injections assisted in initiating this recovery, and when they were discontinued the menses stopped. Physical examination revealed a somewhat infantile reproductive system in a markedly emaciated body (height, 5 feet, 6½ inches, weight, 92½ pounds). The patient did not want to remain in hospital, screamed her demands to go home. She was timid, anxious, tense. She said that she felt compelled to diet, and felt that her impulses were uncontrollable. She soon cooperated, tried to eat, wrote home that the food was delightful; but she wanted to be released at once. When her demands were refused she grew difficult, had frequent tantrums, chewed her food

compulsively, feared the other patients, felt she was a fraud "because people thought her so sweet and gentle when actually she felt nasty and disagreeable."

When her weight had reached 120 pounds, five months after admission, the hospital discharged her. Little had been done to change her outlook for the simple reason that rapport was difficult to establish. It was not until five months after her discharge that she was able to tell her physician the story about the boy whose touch had precipitated the fear of pregnancy.

Behavior after discharge About two months after her discharge from hospital her eating difficulties returned. These were precipitated, this time, by her attendance at a party during which a young man who was partially intoxicated "got fresh." Again she was unwilling to enter hospital, deceived those about her as to the amount she was eating (putting food in paper napkins in her pockets and drinking water to hide her weight loss, and so on). A year later her weight had fallen to 100 pounds, and the temper tantrums had returned. She spoke of "awful feelings" which began in the genital area and went down to the left foot, where she complained of swelling and pulsating feelings.

A note on the parental background Her father, a blustering Irishman described as a "quick-tempered, moralistic Roman Catholic," had grown up in a poor home, one of thirteen children. At the age of 12 he had sexual intercourse with one of his sisters. This sister later had an involutional depression.

The mother was two years younger than the father. She had been extremely fearful for years. Her brother had been hospitalized for paranoid schizophrenia over a period of 25 years.

A summarizing note There are so many unknowns in a case of this complexity that it requires considerable temerity to attempt a formulation. With mental illness in both maternal and paternal lines, the case could be viewed as an instance of inherited constitution. With the physician's findings of infantile reproductive structures, it could be diagnosed as a genetically determined weakness in the gonadal reproductive system. With the infantile fears and the compulsive personality pattern, we could search out those factors in the family frame that shaped the developing personality. With the father's own background and his boyhood lapse (and easily inferred sense of guilt) which led him to project his own guilt feelings upon those who surrounded his daughter, and to attempt to protect (and frighten) her, we could build the case around this parent. The fact that the patient's menses began at the usual time, and that their cessation

would be adequately accounted for by her dieting, makes the endocrine basis doubtful. The pathology in her surroundings, in her father's attitude, is so frankly apparent that the hereditary factors are not required (although they may have contributed a kind of biological "soil" in which the seeds of pathological adjustment could flourish).

The outstanding feature of the case seems to be the fact that the whole family frame within which she developed was so hostile to a normal, adult, womanhood, that in spite of constitutional factors strong enough to carry her to adolescence in fairly normal fashion, a final defeat and reversal occurred. Supported by the hospital environment, the physician's talks, she was able to resume a normal pattern of eating and growth, but when she returned to the extramural life the same constellation of precipitating factors again took charge of her destiny. With a more vigorous constitution she might conceivably have been able to counteract the baleful influence of the family frame. With more penetrating psychotherapy the hospital might have given her insight into her problems to such a degree that she could have maintained health on the outside. Or with some re-arrangement in her mode of living, some new adjustment with her agepeers, she might have found supporting forces.

One final comment may be in order. A case of this type does much to deflate the psychologies that elevate the principle of homeostasis (or other instinctive forces) into a philosophy of human conduct and growth. The steady-state to which this girl tended constantly to return was a biologically unsound one. The chemical and endocrine factors had to come to terms with a father's moralistic make-up, and the balance finally achieved was not one that favored an optimum growth. The integration she arrived at was a warped, one-sided, easily upset constellation which gave her no inner peace, no security. Her "instinctual" goals were thwarted. Her concept of "goodness" defeated those biological forces that would have otherwise carried her on to womanhood. In sum, we can say that her development—as is always the case—was no better than conditions permitted it to be.

REFERENCES

1. C M McKay, "Chemical Aspects of Ageing," Chapter 21 in E. V Cowdry (ed), *Problems of Ageing* (The Williams & Wilkins Company, 1939)
2. C. P Stone, "Delay in the Awakening of Copulatory Ability in the Male Albino Rat Incurred by Defective Diets I Quantitative Deficiency," *Journal of Comparative Psychology*, 4 (1924), pp 195-224 "II Qualitative Deficiency," *Ibid*, 5 (1925), pp 177-203.
3. Karl E Mason, "Relation of the Vitamins to the Sex Glands," in Edgar Allen (ed), *Sex and Internal Secretions*, 2nd edition (The Williams & Wilkins Company, 1942), p 1153
4. R G Hoskins, *Endocrinology* (W. W Norton & Co , Inc , 1941)
Clemens E. Benda, "Studies in Mongolism II The Thyroid Gland," *Archives of Neurology and Psychiatry*, 41 (1939), pp 243-259.
5. R T Hinton, Jr , "A Further Study on the Role of the Basal Metabolic Rate in the Intelligence of Children," *Journal of Educational Psychology*, 30 (1939), pp 309-314
Nathan W Shock and Harold E Jones, "The Relationship between Basal Physiological Functions and Intelligence in Adolescents," *Psychological Bulletin*, 36 (1939), pp 642-643
H B Rothbart, "Basal Metabolism in Children of Normal and Subnormal Intelligence," *American Journal of Diseases of Childhood*, 59 (1935), pp. 672-688.
6. Andrew W Brown; I P Bronstein; and Ruth Krames, "Hypothyroidism and Cretinism in Childhood VI Influence of Thyroid Therapy on Mental Growth," *American Journal of Diseases of Children*, 57 (1939), pp. 517-523
7. C P. Richter and J F. Eckert, "Behavior Changes Produced in the Rat by Hypophysectomy," *Proceedings of the Association for Research on Nervous and Mental Disease*, 17 (1936), p. 561. See also Richter, "Biology of Drives," *Psychosomatic Medicine*, 3 (1941), pp 105-110
8. Charles H Mayo, "Thyroid Deficiency A Commonly Unrecognized Disorder," *Collected Papers*, Mayo Clinic and Mayo Foundation, 25 (1934), p 513.
9. H Lisser, in Blumer (ed), *Bedside Diagnosis* (W B Saunders Co , 1928)
10. D K Henderson and R. D. Gillespie, *A Textbook in Psychiatry*, 4th edition (Oxford University Press, 1936), p. 369
Andrew J Akelaitis, "Psychiatric Aspects of Myxedema," *Journal of Nervous and Mental Diseases*, 83 (1936), pp 22-36.
11. Quoted by Nathan Shock, "Physiological Factors in Behavior," in J McV Hunt (ed), *Personality and the Behavior Disorders* (The Ronald Press, Inc , 1944).
12. C. R Stockard, *The Physical Basis of Personality* (W. W. Norton & Co , Inc , 1931)
13. Karen Horney, *Neurosis and Human Growth* (W W Norton & Co , Inc , 1950)
14. Hoskins, *op cit.*, p. 142.
15. Jules Masserman, *Behavior and Neurosis* (University of Chicago Press, 1943).
16. E. Gellhorn, *Autonomic Regulations* (Interscience Publishers, 1943).
17. T H. Bissonnette, "Sexual Periodicity," *Quarterly Review of Biology*, 11 (1936), pp 371-386.

Edgar Allen (ed.), *Sex and Internal Secretions*

Hoskins, *op. cit.*

18 J B Hamilton, "Treatment of Sexual Underdevelopment with Synthetic Male Hormone Substance," *Endocrinology*, 21 (1937), p. 649.

19 G L K Noble and A Zitirin, "Induction of Mating Behavior in Male and Female Chicks Following Injection of Sex Hormones," *Endocrinology*, 30 (1942), p. 327.

20 Marion Jenkins, "The Effect of Segregation on the Sex Behavior of the White Rat as Measured by the Obstruction Method," *Genetic Psychology Monographs*, 3 (1928), pp 457-571.

21 Frank A Beach, "Comparison of Copulatory Behavior of Male Rats Raised in Isolation, Cohabitation, and Segregation," *Journal of Genetic Psychology*, 60 (1942), pp 121-136

22 Charles O Whitman, "The Behavior of Pigeons," in *Posthumous Works of Charles Otis Whitman*, Harvey Carr (ed) Vol III (Carnegie Institution of Washington, 1919).

23. W Craig, "Male Doves Reared in Isolation," *Journal of Animal Behavior*, 4 (1914), pp 121-133

24. Josephine Ball, "Male and Female Mating Behavior in Prepubertally Castrated Male Rats Receiving Estrogens," *Journal of Comparative Psychology*, 28 (1939), pp 273-283.

25. P. W Whiting and E J Winstrup, "Fertile Gynandromorphs in Habsobracoon," *Journal of Heredity*, 23 (1932), pp. 31-38.

H G Wells, *Science of Life*, Vol. I (Doubleday, Doran & Company, Inc, 1931), pp. 563-564.

Edgar Allen, *op. cit.*

26. Emil Witschi, "Modification of the Development of Sex in Lower Verte-

brates and in Mammals," Chapter IV in *Sex and Internal Secretions*, Edgar Allen (ed), pp 145-166

27. Frank A Beach, "Arousal, Maintenance, and Manifestation of Sexual Excitement in Male Animals," *Psychosomatic Medicine*, 4 (1942), pp 173-198.

28 Alfred C Kinsey, "Homosexuality Criteria for a Hormonal Explanation of the Homosexual," *Journal of Clinical Endocrinology*, 1, (1941), pp. 424-428.

29 George W Henry, *Sex Variants* (Paul B. Hoeber, Inc. 1941)

Catherine C. Miles, "Psychological Study of a Young Male Pseudohermaphrodite Reared as a Female," in *Studies in Personality*, Quinn McNemar and Maud Merrill, editors (McGraw-Hill Book Company, Inc , 1942).

30. S Zuckerman, *The Social Life of Monkeys and Apes* (Harcourt, Brace & Co, Inc., 1932)

H C Bingham, "Sex Development in Apes," *Comparative Psychology Monograph*, 5 (1926), pp 1-161

R M Yerkes and J H Elder, "Oestrus, Receptivity, and Mating in Chimpanzees," *Comparative Psychology Monograph*, 13 (1936), pp. 1-39

31 Carney Landis, *Sex in Development* (Paul B Hoeber, Inc , 1941).

32 Alfred C Kinsey, W. Pomeroy, and Clyde Martin, *Sexual Behavior in the Human Male* (W. B Saunders Company, 1948).

33 R T. Sollenberger, "Some Relationships between the Urinary Excretion of Male Hormone by Maturing Boys and Their Expressed Interests and Attitudes," *Journal of Psychology*, 9 (1940), pp. 179-189.

34 C. P Stone and R. G. Barker, "The Attitudes and Interests of Pre-menarcheal and Post-menarcheal Girls," *Journal of Genetic Psychology*, 54 (1939), pp. 27-71

35. Helene Deutsch, *The Psychology of Women* (Grune & Stratton, Inc., 1944).
36. W. Malamud, S. L. Sands, and I. Malamud, "The Involutional Psychoses. a Socio-psychiatric Study," *Psychosomatic Medicine*, 3 (1941), pp. 410-426.
37. Edgar Allen, *op. cit.*, p. 1289.
38. Herbert R. Stolz, "Shorty Comes to Terms with Himself," *Progressive Education* (October, 1940), pp. 405-411.
39. Lincoln Rahman, Henry B. Richardson, and Herbert S. Ripley, "Anorexia Nervosa, with Psychiatric Observations," *Psychosomatic Medicine*, I (1939), pp. 335-365.

PART THREE

Motivation and the Affective Processes

CHAPTER 7. The Style of Life: A Bio-Social View of Needs and Purposes

CHAPTER 8. The Emotions

CHAPTER 7

The Style of Life: A Bio-Social View of Needs and Purposes

In those persons whom we know best we come to sense a certain over-all quality, a certain life style. The goals they persistently seek, their ways of solving their problems, the manner in which they define the world about them, their dominant moods, have an internal consistency and a uniqueness that we sense even as we realize how difficult it is to describe them with precision. These life styles differ in their internal consistency, in their degree of integration; and they differ in that central core of persistent needs that motivate their actions. Our task will be clearer if we look at a pair of contrasting life styles which emphasize this factor of organization. We shall avail ourselves of what might be called "clinical stereotypes": well-recognized syndromes, or "symptom clusters," which recur frequently enough in practice to provide convenient reference points.

The Psychopathic Personality

First, let us consider the psychopathic personality. Of at least average ability, the psychopath can make a good first impression; but he is so poorly organized that it is unwise to expect his promises to be fulfilled. He makes many false starts but never follows through. He lies so readily, and in so many places where truth would seem to serve, that he is sometimes referred to as a pathological liar. He drifts from job to job, from place to place; but there is a sameness about the predicaments in which he finds himself. He does not seem to profit from experience.

Well-intentioned people try to help him, and often they are certain that he has been grossly misunderstood, certain that there is something good in him. He soon proves to them that he is incapable of fulfilling his promises, of showing gratitude, or love. Affection and interest lavished upon him yield minimal returns, and he remains unstable. In a sense he is amoral, rather than immoral, for he has little or no conscience. Although he has many sexual adventures (and a large proportion of sexual offenders are classified as psychopaths) he might be said to have no love life in one respect; for he is incapable of any deep and continuing attachment to another person. He does little or nothing for the sake of another. He is not bound by considerations of other people. Seemingly unequipped with a censoring "better self" he acts on present impulse, with few inhibitions and with little thought for the morrow. He simply does not take shape.

The psychopath comes very near to being the person *without* a goal, *without* organization, *without* any dominant purpose. He is not a "joiner"; in fact he is unsuitable for any organized group-life in which there are duties and responsibilities. Two years without change, in one place, are unspeakably boring. He is the rolling stone that gathers no moss. He is often clever—though usually in a superficial sort of way—and he will lack those skills that require patient effort, persistent practice. He knows a variety of odds and ends, but his knowledge, like his life as a whole, is apt to lack organization. He is frequently short of funds. He fills the ranks of the drifters, casual laborers, adventurers, beachcombers, hoboos, prostitutes. The armed forces will reject him if he can be detected at the induction center.

His easily aroused hostility, his lack of response to those who would help him, make the psychopathic personality, of all human materials, the least rewarding object of any therapeutic endeavor. Even the psychiatrist and the case-workers, hardened by long experience with abnormal types, tend to reject him as unpromising material.

The Highly Organized (Rigid) Personality

Almost at the opposite pole lies the extremely conscientious person. With his high standards, his concern for the conventions, his well-thought-out plans, there is little place for impulsive action; indeed, a simple spontaneous and uncalculated action is rare. His spending is calculated, limited, and not for passing show or for the simple gratification of sensual appetites. He reads little that is ephemeral, but chooses that which will add to his store of knowledge and wisdom. He seldom takes a vacation, and when he does, carefully laid plans fill it with useful deeds. He plays very little, wastes little time, relaxes seldom. Even his hobbies are made to yield some profit, and he

tends to confine rather than to scatter his interests. He is not one to relish changes; he forms habits quickly and modifies them with difficulty. Moving or travelling are costly experiences, they disrupt his nest habits. Worse still, they interfere with his long-term goals. He is slow to form new acquaintances and tends to be demanding and censorious rather than broadly tolerant. He expects others to live by an ethical code that is as rigid as his own. His affections may be as deep as they are narrow; but although he is a "one-man dog" his wife may not find him easy to live with. He is as stubborn as he is conscientious, and as meticulous about his person as he is in keeping appointments and paying debts. Although he lacks the spontaneity and flexibility required for promotional and public-relations work, he can discharge routine responsibilities with speed and precision, and in any organization he will be responsible and trustworthy.

Other "Types" Sampled

In addition to the pair we have sketched there are other examples in which some one theme, some recurrent pattern of interest, some habitual way of meeting problems, seems to give the key to the organization of the personality.

There is the *power-seeker* who seeks to dominate every field and seems to feel that he needs little affection beyond that which he can coerce. A threat to the security of others, he often creates counter-aggressions, discovers plots against him. His hostility is matched by his suspicion of others.

The *anxious* person, easily upset, sees a potential thunderstorm in every summer cloud. His responses spill over into that part of the nervous system which cares for the vital processes of respiration, circulation, digestion, and elimination; and his heart attacks, dizziness, bronchial asthma, belchings, ulcers, colitis, and nervous exhaustion supply the physician with about one-third of his daily practice. Unlike the power-seeker he approaches the new situation with the thought, "Who will defend me, here? How can I remain inconspicuous, avoid arousing antagonisms?" And in his relations with others he sometimes seems too dependent, as though he were seeking a parasitic attachment. His "sweetness" cloys, and seems insincere.

The *ascetic*, compulsively good, compulsively sacrificial, finds it difficult to enjoy the good things of life because others cannot share in them, because his own sense of guilt would destroy appetite, because the "joys of the flesh" are sinful. His *pleasure-loving* brother, on the contrary, devotes his energies to finding all manner of sensory gratifications: good food, good wine, fine garments, delicate perfumes, good music, good exercise, good pictures, good color schemes. He knows the best hotels, the correct wine to

order, the proper way to prepare a salad, the unusual cheese, the proper meat sauce. In love with the sensations that give pleasure, he is often psychosexually immature like the scolded child who turns to thumbsucking, the self-loving sensualist seems to be arrested in a world of sensory delights that he can control, pacifiers in an affectional void.

The shut-in, *introverted* person breathes easily when the guests have gone; for now he can turn to the world of books, music, art, science, or to the world of his own fancies. Never ask him about the births, deaths, marriages, illnesses, or the personal appearance of his associates. He was not thinking about these things. The *extrovert*, on the contrary, cannot bear to be alone. As soon as he is free he flies to the telephone, arranges a party, calls in his friends, hastens away to join some group. It feels good to be with people; here a man comes to life.

The Question of Types

These clinically recognized types are presented for the purpose of emphasizing the nature of our problem. Life styles are different. Each life style has its own view of the world, approaches a new situation with a unique set of demands or expectations, *needs* to get rather specific things out of the situation, *perceives* its own meanings, experiences more or less unique *emotions*, and will *learn* that which is germane to its purposes. Indeed, each individual is different.

Actually, the type is little more than a convenient fiction. In life we find mixtures, degrees of a quality, overlapping. Most of us are neither introverts nor extroverts, but mixtures (ambiverts). We are neither sensualists nor ascetics, neither anxious nor aggressive; or, rather, we are now anxious, now aggressive, and frequently both, depending upon the circumstances. The types do not exist in nature, sharply defined. They may help us to communicate, to describe, to isolate aspects of a complex totality; but they should not lead us to forget that nature does not respect our categories. It is the individual who is real.

Attempts to Correlate Life Styles with Body Types

Attempts to correlate life styles with the physical makeup of the organism have existed since Aristotle first proposed a science of physiognomy; and they are still being made within the present century. Kretschmer¹ and Sheldon,² to name but two, have recently sought to correlate body build with life styles, with proneness to specific psychosis. The evidence upon which these systems have rested is rather meagre; some studies have contained rather serious methodological errors. On the basis of evidence reported to

date we must conclude that the efforts to validate them have failed. (One study of adolescents led to the discovery of a relationship between somato-types and life styles that was no greater than chance ³ Burchard, testing Kretschmer's hypothesis, also found a poor relationship between life style and body type. The *pyknic* type [supposed to furnish the manic-depressives in hospitals, the outgoing extroverts among normals] furnished 50 per cent of Burchard's extroverts, 38 per cent of his introverts.)

The need for some simple method of estimating life style is great; for the organization of a personality is difficult to see. The study of a life style requires infinite patience, the sensitivity of an artist, and the power to synthesize complex, ambiguous, and even contradictory "facts." Perhaps this difficulty helps to account for the perennial invention of relatively simple and mechanical systems of measuring personality. Certainly a life style cannot be read from photographs, or from a set of measurements of bodily structure, however precise.

COMPENSATORY ADJUSTMENTS

We can look upon the structural makeup of the individual as a primary biological fact, and see it as a basic factor in the development of the style of life, without falling into the physiognomist's or typologist's fallacies. Nor need we look upon organic variations with a mechanic's eye, seeing the bodily machine merely as a system of receptors, conductors, moving levers to be displaced in response to stimuli. The facts of homeostasis point in another direction: the organism is a self-equilibrating system which strikes back against every assault with a compensatory counter-thrust. The respiratory system offers a convenient illustration of this. In the rarified atmosphere of the mountain-top the breathing rate is speeded in order to maintain a normal oxygen supply, and in strenuous exercise the contracting muscles create an oxygen debt which the heart and rib-cage muscles work to pay off long after the actual work is over. The thermostat-like regulation of bodily temperature, and the hungry organism's vigorous demand for food are other illustrations of these counter-thrusts which arise in response to deficit-creating stimuli. These compensatory thrusts show that the organism is a dynamically organized system constantly adjusting to a changing milieu in such a way as to maintain itself.

This ability to compensate is vividly shown in the effects of surgical removal of glandular tissues. If the organism were a wholly passive mechanical system such operations would produce deficit phenomena only. Instead, the

tissues that remain readjust to the loss. In some cases there is a readjustment of the behavior of the organism as a whole so that *functions* are maintained even though the *mechanisms* have been grossly altered.

The Experimental Study of Organ Inferiority

The parathyroid glands, four small reddish-brown bodies on the surface of the thyroid gland, secrete a hormone that is necessary for calcium metabolism. (See Figure 17, page 133.) A calcium deficit develops following their removal; and if an increased feeding of calcium or parathyroid extracts is not initiated promptly, muscular irritability, sensations of quivering, headache, and weakness are reported by human subjects. In the developing infant defective bone growth follows. Richter showed that, with parathyroid glands removed, rats promptly increased their own calcium intake, spontaneously choosing calcium-rich substances when given free choice of pure food substances. If the required calcium is present in the array of edibles presented, the animal's altered appetite will guide his food-choices in such a way that the tissues will be maintained in a near-normal state in spite of the absence of parathyroid secretion. If identical food-cups containing colorless liquids are placed in constant but discriminable positions at the side of the animal cage, the calcium-deficient rat will learn the location of the one containing calcium lactate, and will drink amounts far in excess of the pre-operative intake.⁴ Without previous experience to serve as a guide, the animal's sense of taste serves to identify the substances that he requires. His appetite corresponds to his chemical needs, and the incentives that have a biological value control his behavior.

A similar compensatory appetite follows removal of the adrenal glands. The two adrenal glands, small conical caps attached to the two kidneys, are vitally important agencies in the sequence of chemical changes involved in sodium metabolism. Without them a sodium deficit develops, and a corresponding salt hunger appears. Richter describes a patient, a boy of 3½ years, who literally ate salt by the teaspoonful. Upon his admission to the hospital, the staff reduced his salt intake to normal. They were at that time unaware of the compensatory character of the craving, and felt that it could not fail to harm the child. Within seven days the boy died. A post-mortem examination revealed an adrenal tumor.⁵ Experimental studies subsequently showed that when adrenalectomized* rats were offered the choice of pure water or a 3 per cent solution of sodium chloride they chose the salt solution and maintained themselves in spite of the alteration in the physiological

* The suffix *-ectomy* indicates that something is cut out. Thus, adrenalectomized rats have had their adrenal glands removed.

mechanisms Further experiment has shown that if the taste nerves of such adrenalectomized rats were severed the salt water preference was lost. Failing to maintain their sodium supply such animals died within a few days.

Other studies have shown that an experimentally induced vitamin B deficiency creates a compensatory craving for vitamin-B-rich foods ⁶

When these compensatory adjustments are chronic, changes in organic structure may appear Chronic oxygen deficiency in experimental animals stimulates the bone marrow to produce more corpuscles for the blood, and the heart—working to compensate for the deficit by increasing the blood flow—becomes hypertrophied; the very structure of the thorax is altered ⁷ A damaged heart valve which permits blood to leak back into the ventricle from the aorta, while the heart muscle relaxes and the ventricle fills for the next beat, causes the heart to increase the strength of its contraction at each beat to such a degree that the average arterial pressure is maintained The fluctuations in pressure are greater, the work of the heart muscle is increased, the muscle hypertrophies, and if the damage to the valve is not too great the flow of blood is maintained at such a rate that deficits in the blood-irrigated tissues do not occur.

It requires very little imagination to organize these facts into a theoretical construct with which to approach the problem of the style of life In fact, it requires a certain restraint *not* to elevate these findings into an all-embracing law that will integrate the most diverse facts, facts ranging from the social and ethical spheres to the level of heart muscle and bone structure. For the studies indicate that: *deficits produce compensatory cravings; compensatory overdevelopment arises from organic inferiority; the failure of normal mechanisms leads to the substitution or creation of coping mechanisms which accomplish the same end-result.*

The Theory of Alfred Adler

Adler has formulated a system of description and interpretation of human behavior which makes this tendency to compensate for deficits, inferiorities, the central psychological fact ⁸ The individual's style of life is viewed as an integration of strivings provoked, in the first place, by the individual's weaknesses and organ inferiorities, and secondarily by the threats from the outer environment The drive for power is seen as rooted in a sensed weakness in the face of threats from without. Thus the oratorical gifts of a Demosthenes could be traced to a primary deficit, stammering; the musical gifts of Bruckner, Beethoven, and Mozart to auditory defects What is talent? A compensatory bulwark reared by the threatened ego against dangers rooted in a sensed weakness. Adler would have appreciated Schulberg's story, *What*

Makes Sammy Run?, for the tale depicts the ruthless striving arising out of the inferiorities and punishments suffered by a Jewish boy reared in the lower east side of New York.

Even as an organ, such as the heart, compensates reflexly and automatically, he believed that the person could take his basic orientation reflexly, unconsciously pursuing a life-line neatly calculated to compensate for deficits and weaknesses, even when the process is almost wholly beneath the surface of consciousness. Following Freud, he believed that many of the basic motivations underlying these compensations have been repressed, thrust out of sight as too unpleasant or too terrifying to contemplate.

For the moment we shall not be concerned with the speculative extensions of Adler's theory. Instead, let us turn to the kind of evidence that will help us to evaluate the main implications of this theory of compensation.

A Study of Identical Triplets

A series of observations made upon a set of identical triplets may serve to illustrate some of the complexities that force us to qualify compensation theory.⁹ The uniovular origin of these three infants removes the possibility of explaining their marked personality differences in terms of inherited factors. There were, however, *congenital* differences, which an Adlerian might seize upon. Fred, John, and Henry, to name them in their order of birth and size, started from a single fertilized ovum, but at birth there were notable differences. The weakest of the three, Henry, demanded and received the greatest amount of attention. At two weeks his inability to retain his formula, his fretfulness, his failure to gain weight, his poor sleeping habits, alarmed both physician and parents. They were afraid he would die. He was held while he took his bottle, picked up when he whimpered, and was given optimal care. The other two were given less attention, and as they grew older they were more apt to receive reprimands when they failed to conform to the family's expectations. By the eighth month Henry was well on his way to becoming the typical spoiled child. Then, as he gained in weight and strength, his family began to resent some of the traits they had nurtured and took measures that would, as they believed, correct them. He was reduced to a plane more nearly resembling that of his brothers, with a more nearly equal share of attention, affection, punishment. It was at this period that the mother and John struck up an alliance which persisted throughout the nine years of observation. On her part the mother was quite unaware of showing any partiality; but John's marked attachment to his mother was very clear to the observers (who also heard the mother refer to him as a "mother's boy"). Turning from her weakest, now grown stronger

and in danger of being spoiled, the mother seemed to select the one in the remaining pair whose need was greater. Fred, with a stronger and more placid makeup, could look out for himself; now John needed her. By the 30th month the three boys had each developed a characteristic life style, and these styles persisted throughout the period of the study.

Henry's design for living. Henry had become the leader, dominating his brothers and the children of the neighborhood, getting into mischief, exploring the handbag of the visitor from the clinic (to his mother's distress), taking the laboratory apart on the routine visits. He disobeyed his mother repeatedly. She told her visitor from the clinic, "Punishment has no effect. I've tried everything." Frequent spankings were forgotten almost as soon as administered. Henry was the one who got into fights, set the pattern of play, he was the first to try something new, the first to get acquainted with strangers. Corrected or thwarted, he threw a tantrum, stamped his feet, displayed aggressiveness. Insensitive to criticism and disapproval, butting into an organized group, disobeying his mother's injunctions, taking things apart, using up what others valued, Henry seemed to have become the toughest of the trio.

John, the mother's boy, paid in kind for his mother's consideration. He rescued her belongings from his inconsiderate brothers and occasionally carried tales. Defeated by his brothers, he would rush to his mother for aid, his loud wail announcing his approach. His language skills were developed far beyond those of his brothers, and he used them artfully in the enlistment of aid. He got along well with older people, but was slow to make friends with strangers. He was always hesitant about trying anything new, the last of the trio to embark upon mischief, the most disturbed by punishment and disapproval. John obeyed. Some adults were inclined to call John more socialized, since he conformed to their wishes, was less of a nuisance, behaved politely.

Fred, the first born (and largest), was quiet, self-contained. He was more difficult to observe, in the sense that he was so wholesomely average. He did not strike the eye. He obeyed better than Henry but was less disturbed by punishment than John. When his mother went away Fred remained calm and undisturbed, whereas John was the first to put up a howl. Fred was less timid, less obedient than John; less curious and less aggressive than Henry.

It should be pointed out, in this case, that much more is involved here than a simple organic inferiority and an automatic compensation. The weakest *did* become the dominant one, it is true. It is probable, however, that without the mother (and *her* compensations—and the cultural background that makes preservation of life something of an absolute value) the aggressive

demands of Henry would not have developed as they did. She strengthened his drives by reinforcing them, increased his demands by her solicitude, heightened his fretfulness by her prompt responses. In a Spartan community the weak are exposed. In the competitive struggle of the barnyard the runt is crowded away from the swill, the weakest chick finds himself at the foot of the pecking order. * Similarly, without reciprocity between John and his mother, John's pattern would not have been fixated. Bound into socially approved bundles by the rewarding maternal affection and interest, his impulses took on adult form more rapidly than was the case with his brothers. He came to identify himself with his mother, battling for her while Henry battled against her. A family constellation was formed within which the individual needs sought expression; and in the interactions between persons the three life styles developed. Each of the five people making up the household had a different reinforcing and inhibiting environment. Biological differences there were, at birth, and these differences produced not only different needs and different capacities of responding to stimuli from without but also different responses in the human environment. Crucial to the outcome, too, was the cultural framework that had previously defined and interpreted biological differences of this type.

A Study of the Physically Handicapped

A study of the physically handicapped would offer a promising field for the testing of the Adlerian theory. If the typical sequence of events occurs here we should find the handicapped person: (1) comparing himself with others, (2) feeling inferior, helpless, anxious, threatened, (3) compensating for his sensed inferiority by (4) constructing specific kinds of power-goals (often fictitious), and (5) employing exaggerated means of coping with the world that is seen unrealistically as though through lenses distorted by

A study of the traits of men who varied widely in physique is reported by Eysenck, who classified 1000 British soldiers according to body-size. A comparison of the personality traits of the two extreme groups (the microsomatics, the very small, macrosomatics, the very large) raises questions for the Adlerian hypothesis. The composite picture of the "little men" does not correspond to any simplified interpretation of compensation theory: we do not get the picture of the pompous little martinet, the little Napoleon, the loud-voiced gesticulator compensating for inferior size and stature. Instead, the microsomatic is described as "unskilled, of poor education, dull, has poor vocabulary; his hobbies are narrow, his sexual activity is inhibited, and his physical health bad. His muscular tone is bad, he does not drink much, and has broken down although not so often exposed to enemy attack. He has lost weight, and is likely to be boarded out of the army. Temperamentally, he is weak and dependent, inert, hypochondriacal, anxious and depressed. Altogether, both mentally and physically he is what is popularly called 'a poor specimen'." The macrosomatics were at the opposite end of the scale in these traits. See H. J. Eysenck, *Dimensions of Personality* (Kegan Paul, Trench, Trubner & Co., Ltd., 1947), p. 94.

his special power-needs. The investigation of Landis and Bolles supplies the type of concrete evidence Adler never found time to collect; and it introduces quantitative measures into a field that had been too exclusively treated in a purely speculative fashion.

The data were obtained from a study of 100 physically handicapped women,¹⁰ equally divided between four categories: spastics, cardiacs, epileptics, orthopedics. The handicaps had appeared at periods ranging from birth to thirteen years of age; and the disabilities ranged in degree from very slight to almost complete. All volunteered to participate in the study. Each subject was studied in a carefully standardized interview, and then was given two standard personality tests.

Four outstanding conclusions emerge: (1) The handicapped group expressed attitudes and described their own behavior in ways that indicated *a general immaturity*. This immaturity showed itself in all aspects of their lives—in their thinking, their plans for their own future, in their excessive dependence, in their reactions to people. (2) They were more closely attached to and *dependent* upon their parents and their immediate family than a comparable group of normal women. (3) *Psychosexually* they were also less mature; and their behavior during the interview as well as their answers to specific questions indicated a general hyposexuality, a lower-than-normal sexual drive. There was no indication of their feeling thwarted, repressed, or frustrated in this area. The low level of interest in this area is of some significance in view of the fact that the findings of a gynecological examination were normal and the age at onset of puberty typical. Neither anatomical nor endocrine differences were apparent. (4) Wide individual *variations* in adjustment were noted. These differences seemed to be more closely related to the age of onset and to the severity of the handicap than to its type, or to its effect upon the person's appearance. Each type of deficit seemed to produce a similar array and distribution of adjustments.

The life styles of the handicapped The investigators were able to isolate four general types of adjustment. The table on page 178 shows the relative frequencies of the types among this group of subjects.

It is apparent from these findings that compensation for inferiority is not inevitable, and that where it does exist there are widely divergent forms of adjustment which can be covered by the same classificatory term. Nearly half of the adjustments were viewed as compensations. The *cyclic* type is uneven, and is prone to break down, at which point the subjects become depressed about their handicap. The *fatalistic* type accepts the handicap as inevitable, and their prevailing mood is one of apathy. The *paranoid* group

project the blame for their difficulties upon their parents (or society) The aggressive group most nearly resemble the type described by Adler. they fight relentlessly and fanatically for their ends Only 9 per cent conform to the Adlerian stereotype

TYPE OF ADJUSTMENT	NUMBER OF CASES
1 Withdrawal	
Extreme	6
Marked	5
Moderate	6
	<hr/> 17
2 Substitute activity	
Satisfactory	9
Unsatisfactory	10
	<hr/> 19
3. Obliterative	16
4. Compensatory	
Cyclic	24
Fatalistic	9
Paranoid	6
Aggressive	9
	<hr/> 48
	<hr/> Total- 100

*Distribution of Cases
According to the
Type of Adjustment to
Physical Handicap*

Some of the women attempted to adjust to their environment by denying the existence of any handicap (obliterative), acting as though they were fully normal; others withdrew from active competition, choosing a path of immaturity and dependence; still others attempted to substitute a variety of interests (often somewhat artificial) for those life denied

Although the handicaps had to be adjusted to, and although in the severe cases they were the central facts in the life of the individual, they resulted in divergent patterns ranging from apathy through dependence to exaggerated and sometimes unrealistic counterattacks The investigators profess agnosticism when the question is raised, "What determines which life-style is selected?" The investigators argue that while environmental conditions may influence the life style, in all probability they are never the primary factors They stress the fact that the life style appears very early and that it tends to remain constant throughout life, and that individual differences appeared where experiential factors seemed similar. They conclude, therefore, that

these individual differences arise from constitutional predisposition. The data do not seem adequate to determine the issue: the very early life-histories were not studied in detail, the reactions of the family to the handicap, and so forth. When we remember the case of Henry, the argument founded upon the consistency and early appearance of the life style is not impressive.

Among conditions that might be advanced as explanations of the handicapped person's choice of life style (in addition to those mentioned) are: the degree of handicap, the constellations of capacities (for instance, that would facilitate effective substitutive or compensatory adjustments), the nature of the supporting environment, the age of onset. For example, those who have already achieved successful adjustment before the onset of the handicap will be more apt to seek a near-normal substitute.

THE EXPERIMENTAL STUDY OF NEEDS AND CRAVINGS

For the purpose of thinking through our problem we may isolate a pair of needs that can be studied in the experimental animal (1) the need for sexual expression, and (2) the need for food. The choice is arbitrary, guided principally by the nature of the experimental results now available in the literature.

We may define a need as *a tensional state of the organism brought about by any excess or deficit of substances (or stimuli) beyond the range required to maintain the organism in a state of equilibrium*. In these tensional states the organism is active, responsive, alert. The behavior displays preferences, the responses are selective, and they commonly bring about the end-state (equilibrium, complacency, quiescence, release from tension). At any given moment the tensions operating within an organism are apt to spring from many sources (such as falling temperature, hunger, thirst, sexual tension) so the behavior is influenced by many tensions. The separate acts will, of course, serve to reduce some tensions more than others. Thus the choice of one course of action may lead to an end-state as far as one need is concerned, and yet be very unsatisfactory from the standpoint of other needs. The residual tensions will provide fresh motivation as a cycle of behavior completes itself and will, in turn, induce a fresh line of action. Rising and falling, combining, conflicting, these changing tensions keep the organism alert and striving. They introduce variety and change into behavior; and only as characteristic cycles and solutions become organized into related and recurrent patterns would anything like a style of life emerge.

Measuring the Strength of a Drive. Need-Hierarchies

The experimentalist who attempts to isolate these needs and to introduce varying intensities in the deficit states, controlling the conditions under which release can be achieved and quantifying the consequences of his manipulations of the tensions, is like the "man who played God." He can send the rat scurrying after calcium (by parathyroidectomy), or he can set him building a nest to compensate for lowered laboratory temperature. He can predict the gross daily activity (number of revolutions in the activity cage), estimate the grid-shock intensity required to inhibit a waning sex drive (as the experimental animal ages, or is surgically deprived of the hormone). With obstruction-box techniques he can discover index numbers for rising and waning needs, measuring the strength of the needs for water, sex expression, exploration, sleep, calcium, phosphorous. He can pit one need against another or measure the relative potency of tension-reducing stimuli (incentives).

It is conceivable that for a given type of experimental animal, and for a given set of measuring techniques, the experimenter could arrive at a fairly consistent scale of drive-potencies. Measuring drives at their maximum strengths, Warden found a consistent hierarchy in the drives tabulated below. These values indicate that a female rat will make a larger number of

Numbers of Times Experimental Animals Crossed an Electrified Grid under Various Types of Motivation

DRIVE TESTED	AVERAGE NUMBER OF CROSSINGS
Maternal	22.4
Thirst	20.4
Hunger	18.2
Sex	13.8
Exploratory	6.0
No incentive	3.5

crossings of an electrified grid to retrieve members of her litter than will be the case if she is offered food (after 48 hours without eating). It should be pointed out, however, that in order to get such consistent figures large populations and numerous controls are required. It would also appear that

the position of a particular drive in the hierarchy is in part due to the specific mode of measuring the drive (For example, the maximum point of the sex drive measured by the number of copulations in a free field does not coincide with the maximum point found under the obstruction-box technique.)¹¹

It would appear, therefore, that we ought not to describe a particular drive as *the drive of greatest strength*. There are variations in the position in the hierarchy with age, sex, the method of measurement, the kind of incentives employed, the length of deprivation, the types of behavior measured (grid crossing vs. learning a maze), and so on. In addition, there are individual differences attributable to inheritance. We know that one child needs more sleep than another; one needs certain minerals, another larger amounts of food, activity, and the like. Beach, studying sexual behavior of rats under controlled conditions, noted that there were occasional males that failed to mate despite massive injections of testosterone. Deprivation did not create the usual tensions, preferences, exploratory behavior. Similar observations have been made upon the chimpanzee.¹² Differences in individual history, as we shall see, must also be considered.

Effect of Inadequate Release of Drives

Drives wax and wane with exercise, depending upon the kinds of stimuli that greet the animal's effort to satisfy its needs. If the day's feeding is inadequate, the experimental animal will still be hungry at the end of the period, his general restlessness will be maintained, and the hunger-created tension will continue to mount until a maximum is reached. But there is a point beyond which chronically incomplete release *reduces* the amount of tension, the output of activity. Also, with constant degree of deprivation maintained, and with daily feedings on a less preferred food, the runnings (or grid-crossings) betray the animal's lukewarm interest in the incentive. Where the releasing or reinforcing conditions are chronically less than adequate, a decline in energy output develops. The *expression* of the organism's needs tends to settle down to the level the environment fulfills.

The barren environment of Colvin Hollow, or the state of chronic unemployment that prevailed through the depression of the 30's in certain mining villages,¹³ will produce a lowering of the general level of striving of human populations. Perhaps this accounts for what the Marxian senses in the *lumpenproletariat* (the disorganized mass at the very base of the social pyramid). *Even though they are the most deprived* there is little evidence of a revolutionary unrest. The needs of the slave have a way of adjusting themselves to the slave-environment. Motivated striving (and hope) stay alive only when there is some prospect of fulfillment. Linton is of the

opinion that the sweeper-caste of India, oppressed and despised for generations, living on the edge of starvation and suffering what to us would be intolerable deprivation and frustration, are nevertheless more contented, more relaxed, than the relatively free, socially-mobile groups in America.¹⁴ Here the chance to succeed is just live enough (for millions at least) to preserve the myth of the career open to anyone with talent, to make those in lower status positions fret against restraint and yearn for more of that which is attainable. Appetite and perseverance grow when they are fed.

Beach's study of the sexual behavior of the male rat showed that when a mature rat is confined with males or with non-receptive females over a long period, the number of his approaches to a receptive female on periodic tests steadily declines. He behaves as though his sexual needs were decreasing, but when he is again placed with sexually active and receptive females for a period, his *drive-expression* is restored.¹⁵ The chronically associated consequences of need-expression leave traces within the organism which enhance or diminish the strength of the need *as measured by the activity it normally instigates*. The animals behave *as if* the drive itself had diminished.¹⁶

The Effect of Punishment

When an animal is punished for the overt expression of its needs, a decline in need-expression follows. For example, punishment for eating results in an apparent loss of appetite: not only is food refused in the experimental setting, but the appetite-loss seems to be a general one. Forced feeding may have to be instituted in order to spare the animal.

Masserman's studies of drive-conflict employed a shock (or a hissing air-blast) which startled the animals just as they opened a food container in which they had always found salmon. Most of his animals soon showed "neurotic" behavior. Some of his animals showed acute panic, rapid and irregular pulse and respiration, and made vigorous attempts to escape from the apparatus. They were finicky eaters outside the experimental apparatus in spite of a food intake that was too small to maintain weight. An experimental anorexia had developed. Some of the animals underwent what might almost be called a personality change, sulking in schizoid withdrawal or savagely attacking mates with whom they had hitherto lived in peace. The direction of these changes could not be predicted from any of the experimental data. Some became playful, excessively interested in getting the experimenter's attention, others cleaned themselves and preened continually, still others became vicious and aggressive, snarling and attempting to bite anyone who offered food.

In Masserman's experiments a very few exposures to this conflictful

situation sufficed to throw the whole need-economy out of balance, and the changes in the animal's mode of adjusting tended to persist unless therapeutic measures were instituted. Thirty out of thirty-seven animals studied were treated with a kind of rest cure (freedom from all experimental manipulations) lasting from two to twenty weeks, but the abnormal behavior recurred as soon as they were placed in the apparatus. These results are comparable to those found by Anderson, Liddell, and Parmenter, who used the conditioned discrimination technique of Pavlov to produce neuroses in sheep and found that the abnormal patterns persisted over long periods. Cases in which the "neurosis" persisted for from 3 to 11 years are reported¹⁷

The reactions of the neurotic cats to the food-buzzer (crouching, trembling, mewing, and the like) when it was sounded alone, after the training, testify to the potency and persistence of the after-effects of the training. In setting up the reaction Masserman had used a small floor-switch which could be closed by a cat's paw-pressure. Smearing this with salmon juice to attract their interest, he had taught the cats to press the switch (which operated a buzzer) before going to the food-cup and nosing the latter open to secure food. If the cat nosed the cup before the buzzer switch had been pressed, he found the food-box closed and locked; and he quickly learned to perform the required sequence of acts. Hungry, he pressed the switch for the releasing buzzer-sound, then moved promptly to the food-box. The internal tensions became so canalized within a framework of inhibiting and directing tendencies that if the experimenter disconnected the buzzer circuit, the cats going through their sequence would hesitate on their way to the food, turn back, press the switch repeatedly, as though unable to proceed without the "go ahead" signal from the buzzer. In this instance, *the reinstatement of the adventitious conditions under which the drive is normally released has become an objective in itself, and we may speak of secondary goals, subordinate demands*. The training has grafted a buzzer-need upon the original food-need, much as a civilized upbringing develops our human cravings for special flavors and consistencies of food, for a white cloth, silverware, and all the niceties of the well-served meal.*

Whenever there is chronic drive-conflict of this type any and all parts of the stimulus pattern may become disturbing. The harmless buzzer (which

* Except for certain special training-conditions, which we shall examine later, this type of subordinate demand can be maintained only by continued maintenance of the experimental barriers. If the experimenter were to permit the hungry animal to nose open the food-cup a few times (*without* his having heard the releasing buzzer) the carefully established inhibition would disintegrate and the drive would now flow directly to the releasing movements, short-circuiting and eliminating the subordinate demand. Such a change in technique actually formed the basis for the most successful attempts to eliminate the food-neurosis.

had prompted approach before the air-blast was introduced) now becomes an independent source of anxiety and fear. Theoretically, the hunger state itself should become a source of anxiety. The case of the girl who would not eat (page 157) offers a human analogy. Here the girl's training had brought about a connection between the sexual impulse and fear of punishment, loss of affection and approval. With the maturing of the reproductive system and the appearance of normal sexual interests, anxiety appeared in the place of sexual expression. The need, as a chemically induced tensional state, developed with the maturing organism, but the girl's reaction was one of terror, disgust, guilt. The behavior that appeared on the surface seemed pitted *against* sexual expression, against even an awareness or recognition of such needs. Defensive counter-actions were called for; and among them was the self-punishing dieting which ultimately brought about a lowering of the sexual drive itself. The final patterns of need expression are thus seen to be a resultant of a very complex set of factors. In addition to the primary biological ones there are the "built in" anticipations of consequences, the complex process of self-appraisal, and the emotion of guilt.

It should be noted that in the experimental studies it is the *fusion* of conflicting tensions that produces the fixations and "neuroses" we have been describing. Taken singly the tensions are more easily managed. In Masserman's experiment, for example, the air-blast was potent enough; but if the blasts were given alone, repeatedly, the cats grew indifferent to them and the effects did not spread.

Effect of Early Frustrations of Need-Expression upon Development: Displacement and Regression

Failing direct routes of expression, needs sometimes take indirect paths, and if a need is complex, thwarting one portion may produce an intensification of the remaining portions.

Preliminary observations had convinced Levy that the thumb-sucking tendency, which seems so strongly motivated in some children, is directly related to the amount of time spent in nursing. He found that it could be initiated by merely reducing the time spent at breast or bottle from 20 to 10 minutes. He was reminded of the dairyman's observation that calves, taken from the udder and transferred to bucket-feeding, promptly develop ear-licking and other sucking habits. Levy interpreted these facts as indicating that the nursing activity fulfills *two* needs: the need for food and the need-for-exercise of the whole mouth-zone-swallowing apparatus. When the calf is transferred from udder to bucket he continues to get enough nourishment, but tensions in the sucking-swallowing mechanism remain unsatiated. The

perseverating residue of tension leaves the mouth-zone responsive, irritable (in the physiological sense). The sucking response is so easily aroused by any stimulus that this segment becomes prepotent, virtually assuming control of the organism-as-a-whole. That these mouth-zone activities have a compulsive quality can be substantiated by any parent who has attempted to inhibit the thumb-sucking habit. Mittens, aluminum cuffs, safety pins that bind the hands to the bedding, are circumvented one by one. If thumb-sucking is thwarted, then the coverlet, the nightdress, the doll are substituted. If not in one way, then in another, the child expresses this mouth-zone tension.

A study of pups In one experimental study Levy divided a litter of six collie pups into three groups of two animals each.¹⁸ Two were breast fed, remaining with the bitch, two were bottle fed with nipples whose small openings required the pups to feed for 80 minutes, and two were bottle fed with nipples whose larger openings permitted the pups to satisfy their hunger in 13 minutes. The four bottle-fed animals were raised away from the bitch until the 20th day. The short-time feeders rapidly developed habits of sucking their own bodies; and they sucked, licked, and chewed objects in the kennel. They were ready to accept the experimenter's finger as an object to suck upon, whereas the long-time feeders usually rejected it. Although the two short-time feeders took more food (9715 and 9409 cc.) they did not maintain their weight as well as the two long-time feeders (who took 8895 and 8910 cc.). The short-time feeders slept fitfully and were more restless and active. Even after the litter was reunited and the animals were all fed on solids and liquids from a dish the two short-time feeders continued to be the smallest dogs in the litter. At 58 days the breast-fed dogs weighed 18 pounds, the long-time feeders 13 and 13¼ pounds, the short-time feeders 9¼ and 9½ pounds. At 71 days the three groups averaged 21, 18, and 12½ pounds. Correlated behavioral ratings at the 4th and 5th months indicated that there were general maturational differences. When the pups were taken out for walking trips and put through wall-climbing and jumping tests the short-time feeders were always the laggards. When Levy returned them to the bitch the bottle-fed pups did not seek out the breast; and they made the bitch restless. She rejected the strangers and tried to escape from the room. The natural relationships between mother and pups were never restored; neither had developed the normal types of demand for the other.

In a study of human infants, weaned at different ages, Sears found results indicating that the strength of the oral drive (and the strength and persistence of the impulse to thumb-sucking) is directly related to the amount of normal

sucking experience that had preceded weaning. Those weaned almost at once showed the least tendency to develop the habit. Instead of being looked upon as an innate tendency whose strength rests upon internal conditions the sucking-need, like the other needs we have been studying, appears to grow stronger with reinforcement. Until it reaches a certain strength the interruption or frustration of the tendency (or simple non-reinforcement) *weakens* it; beyond this point it is intensified—at least for a period—and tends to spread into other channels.¹⁹

A second experiment. perverse pecking in chicks In a second study, two groups of 10-day-old chicks (100 in each) were observed. One group was housed on a raised wire-mesh platform, which gave no good pecking-surface; the other was housed on the ground and other solid surfaces. The wire-chicks took their food from raised troughs. As in the case of the short-feeding pups the food required to satiate their hunger could be quickly obtained without the normal exercise of the mouth zone musculature, and similar residual tensions could be postulated. Like the pups these chicks turned upon their companions. By the 5th week all of the wire-chicks showed areas of denudation where the feathers had been pulled off. The control group showed denudation in but two instances. The wire chicks were restless, did not maintain weight properly, showed excessive preening, pecking at the wall, pecking at droppings. By the 7th month this feather-picking had waned.

Transfer of the 7-month-old wire-chicks to a coop with an earthen floor initiated a *regression* to their old pecking habits. Within two weeks denuded areas appeared in all the chicks although, in this case, alternate channels of expression were available. Similar regressive tendencies are observed in the human child during a period of readjustment involving emotional stress (such as is sometimes created at the arrival of the new sibling); finger-sucking, bed-wetting, crying (and other outgrown patterns) reappear.

As in the earlier experiment, the wire-chicks showed structural differences. Claws of the wire chicks became calloused and swollen, producing an odd slapping gait. They weighed a half-pound less than the controls at 6 months. At the 7th months the wire-pullets were laying half as many eggs as the controls.

A delayed effect of early frustration: food-hoarding The effect of early feeding-frustration upon later reactions was demonstrated by Hunt.²⁰ Using split-litters of young rats he compared three groups: (1) a group frustrated for 15 days (21st day-36th) following weaning, (2) a group frustrated at a later period (32nd-47th days), and (3) a control group with free access to

food. Frustration consisted of irregular dispersion of 10-minute feeding periods, with intervals varying from 9 to 36 hours

After the early frustrations all animals were returned to free and unrestricted feeding for 5 months. Hoarding tests in which the animals were permitted to build a "stock-pile" of food pellets (under the tension produced by a return to the conditions of feeding-frustration) showed that the early-frustration rats hoarded $2\frac{1}{2}$ times as many pellets during a standard observation period. Those frustrated at the later period did not show the residual effect. Repetitions of the experiment showed similar trends, wide individual differences, smaller differences between experimentals and controls.²¹

SOCIAL FACILITATION AND INHIBITION OF NEED-EXPRESSION

We have seen that the organism's physiological needs tend to develop around them a cluster of subordinate demands and expectancies, which are directed toward those accessory conditions that regularly accompany their fulfillment. In all social animals where growth and development occur in closely knit groups, each individual acquires demands for specific types of relationship with other organisms, as a secondary but inevitable part of the satisfactions of those basic needs upon which his very life depends. Psychologically, it is a literal truth and no mere figure of speech to say that a child takes in attitudes and prejudices with his mother's milk. In his home he acquires demands to have certain kinds of people about him, and to maintain characteristic relationships with them (for instance, to secure their approval and avoid their disapproval) as surely as those home conditions nourish, sustain, and gratify him. Thus the very interpersonal conditions that nurture him serve to bind and canalize his impulses; he, in turn, becomes a "pillar of society" in that he seeks to continue, support, and reinstate the same sort of pattern of social arrangements. Thus the basic biological needs are transformed by the social character of the development process into social needs, and in this process the cues provided by other organisms acquire the power to evoke strong drives within us. Their disapproval affects our very physiology, the sight of the Jones's conspicuous waste sets us to emulating their pattern of spending, the evidence of appetite, fear, anger in others sets us to vibrating sympathetically, symbols take on the potency of the physical stimuli that originally forced us, as infants, to respond. The social cue affects our very chemistry.

Manipulating the Social Factor in the Animal Laboratory

If a hen is allowed to eat to satiety from a pile of grain (until her crop is distended, until her pecking needs are satisfied, until her chemical deficits are neutralized) there will come an end-point when grain is left untouched. Many factors affect this end-point, however. She will eat longer on a soft surface than on a hard one. Even when she seems satiated, the introduction of a second hungry hen will set her to eating and she will consume as much as 60 per cent more.²² If three hens are introduced the increment is larger. If the second hungry bird is one that has been previously dominated, the test bird will drive it away from the pile of grain. If the second bird is a dominant one, and if in its hunger it is mainly concerned with eating, the test bird will continue eating the grain. If the remaining grains are cleared away when a test bird has reached satiety and a fresh pile of grain is placed before it, eating is resumed. This calls to mind human beings at a banquet, or the only child who is such a feeding problem at home but a voracious eater—like the others—at nursery school.

Masserman also observed social factors at work among his cats.²³ In one experiment (in which a floor-switch had to be depressed before the food-cup could be opened) he introduced two trained cats at a time. The switch was placed at some distance from the food-cup so that as one animal pressed it the other animal could reach the food. Soon neither animal would press the switch. The inevitable consequence (non-reward) of his act had lowered the tendency to approach the switch. Although the physiological deficits persisted, the cats would lie upon the cage floor “like two hoboes,” each unwilling to labor for the other.

In a comparable situation Mowrer had produced a similar pattern in albino rats. In one instance, however, one of the more strongly motivated rats approached the food-lever (in this instance the animal had learned to depress a horizontal lever which operated a “food-pellet-vender”) depressing it violently and repeatedly. Enough food pellets were delivered by the machine so that he obtained a share before his waiting cage-mates could devour them all. This animal became a “confirmed worker” while his litter-mates became interested, but parasitic, profit-sharers.²⁴

Still a third solution was achieved by one of Masserman's cats. Following his experience of being beaten to the food-cup, one cat developed a technique of herding his competitor to the far side of the box, from which position the competitor could not win the race to the food. As in the case of the hens, the need operates within a framework of skills developed in inter-individual training.

Dominance and Submission

Some of Masserman's observations were made on groups of four cats. In this case no floor-switch complicated the procedures—it was merely a question of priority at the food-cup, since but one cat could eat at a time. The warning signal indicating that food was available was given by the experimenter. Under these conditions a very uniform order of precedence was established, and a cat who forgot for a moment was promptly put in his place by the animal outranking him. Position in this hierarchy did not seem to be due to any single identifiable factor (such as, age, size, weight, strength of need, general vigor); but under the experimental conditions the combinations of determinants (whatever they were) tended to produce and preserve a very stable hierarchy.

Changes in aggressiveness and dominance Abrupt changes in the order of dominance were introduced, however, when one of the animals was made neurotic by the motivational conflict procedure previously described. When the dominant cat had been so treated his return to the quartet found him at the foot of the line, granting priority to his three cage mates. Those formerly submissive to him now preceded him. Amusingly, under heavy dosage of alcohol (or sodium amytal) the neurotic cat acquired a kind of "Dutch courage" and reasserted his priority. His recovery lasted no longer than the effect of the alcohol, however.

It is interesting to note, in this connection, that the order of precedence gives a poor basis of predicting persistence. In a frustration situation where the box-lid of the food-chamber was held down, the more dominant animal was the first to give up (6 trials), the least dominant persisted twice as long, the intervening pair requiring 7 and 9 trials respectively.

Masserman's observations also show that the absence of overt striving does not prove that the need-tension has disappeared. An animal that has become indifferent to the food-signal (as when paired with a superior) will promptly resume responses when working alone. The submissive animal will then eat more than usual, and he will continue to open the food-cup on the signal even after he is too full to eat. This should remind us of the necessity of discriminating between the actual existence of a need-tension and the demonstration or expression of that tension in overt performance.

The aggressiveness of an animal, as measured by his resistance to being shoved aside, or by his willingness to fight for priority, was found to increase after he had been paired with a desultory or submissive partner and his submissiveness increased after he had met several defeats at the hands of a dominant partner. The constancy of the hierarchy and the relative powers

of each individual depend, therefore, upon the maintenance of uniform group-composition. As in the old French proverb, "In the land of the blind the one-eyed man is king" How can we understand a life style without full knowledge of his history as well as a description of the particular *press* that he is operating under?

The most potent source of aggressiveness proved to be an abrupt displacement downward in the hierarchy. Chronic frustration, especially when gradually imposed, produced an adaptive submissiveness without overt struggle of any sort. On the other hand, having won status, having experienced priority at the food-cup, and in consequence having developed a strong tendency to move directly to the releasing act, the animal violently resisted and persistently attacked anything that frustrated him.

It was the same kind of downward displacement in the human hierarchy that made the depression years such a shock to families that had already won some status. It is the de-classed who suffer most in the revolutionary upheavals, just as it is the upper-middle-class stockbroker who leaps from the hotel window (and not the unemployed farm laborer). For the upper groups the threatened changes mean "the end of civilization" (and socially guaranteed advantages), for the lower class, the have-nots, the revolutionary changes, the deprivations, are met with stoicism and with an air of imperturbability.

Dominance as a generalized trait Out of the continued assumption of the dominant roles in hierarchical orders of the type we have been discussing, an individual may come to portray what might be called a generalized trait of dominance. Originating in circumstances operating in specific contexts this "trait" may finally adhere to the individual in all situations until we sense it as a part of his very nature. In his very walk he betrays his proud expectancies, and he enters into each new scene prepared to claim precedence. In another day men spoke of divine right. In our own time we have heard the matter explained as a matter of the genes. What we are here trying to point out is that there is another set of roots for this particular life style.

In a fluid and complex social order an individual plays many roles, assuming priority here and granting precedence there. We would not expect any generalized trait of dominance to adhere to the individual under such circumstances. This was precisely what the anthropologist noted among the Samoans. The flexibility of relations, the rational ordering in terms of special competence, the absence of the very terms that would designate any permanent superiority as a trait of an individual, show the unity of the Samoan culture and the Samoan psychology.

In our culture, on the contrary generalized dominance-submissive attitudes are very widespread. If it were not so, advertisers could not make such profitable use of "great names," nor would the professional fundraiser be so insistent upon getting certain names at the head of his subscription list. Nor would the personal risk be so great for the very successful person. Our machinery of publicity has now reached a standard of efficiency such that the artist, explorer, inventor, scientist, entrepreneur—anyone, in fact, who has achieved a notable success in his field—must run a gantlet of microphones, news and television cameras, interviewers. His opinion is consulted on the international scene, the treatment of minorities; and the public avidly consumes the accounts of his opinion on salads, child-rearing, tobacco, and facial creams. He has become the Voice of Authority. This "halo effect," this extension of his dominance beyond the field of his competence, this generalized submissiveness which surrounds him, creates a personal risk; and the risk is equally great for the society as a whole if it values either democratic or rational living.

Chronic submissiveness Reflecting upon this great reservoir of fawning submissiveness into which the great man's opinions are tossed, we sometimes lose confidence in man's rationality. We see him accept opinions, repeat slogans, adopt policies contrary to his own interests. He behaves as though his own needs had declined in strength, or were no longer capable of being brought to consciousness, or as though his own need of "someone to look up to" was so great that his own powers of rationality had either atrophied or been inhibited. The ideas of "the best people" circulate as though they were the best ideas—for everyone—until the average man comes very near to asserting that the average man is below average.

The experimental studies that have located conditions producing fluctuations in this trait should make us reflect before we despair of human rationality or conclude, with Aristotle, that some men are *by nature* slaves.

BIO-SOCIAL INTEGRATIONS THE SOCIALIZATION OF TISSUE-NEEDS

Although the tensions we have been studying are formed, in the first place, upon a groundwork of biologically important tissue-needs, the final purposes that emerge from our living together sometimes carry us toward strange goals. Women's hats, caviar, pierced earlobes, tattooed chests, gold teeth, dress suits, and the like. Second-order drives built around the pri-

mary tissue-needs have made an extremely varied set of objects seem desirable. A great deal of human motivation can be described, therefore, as "man-made", as culturally determined, as social artifacts.

On occasion these social conditions operate so as to *inhibit* biologically important needs (recall the case of anorexia nervosa). An instance, all too familiar, is offered by the only child, who seems bent upon starving himself, presenting such a feeding problem that he seems more interested in carrying on a struggle with his mother than in filling his stomach with the food his tissues require.

Let us examine two of these needs in a little more detail, observing the way in which physiological and interpersonal factors are fused into the final patterns of need-expression of the adult.

The Hunger Cycle

When we consider the variety of tissue-needs functioning at one time, the range of conditions that facilitate and inhibit them, frustrating, satiating, deflecting, the developmental histories which complicate them, we are prepared for an almost chaotic behavioral stream. Yet there are regularities.

When external conditions are controlled (soundproof, lightproof rooms) experimental animals show bursts of activity at surprisingly regular intervals. Mounting their cages on tambours to permit automatic recording, Richter found that his rats produced records which showed these bursts at approximately two-hour intervals.²⁵ Investigation showed that the overt actions coincided roughly with an intensification of contractions in the stomach musculature, and that they culminated with eating. Activity cycles could be shifted by altering the feeding rhythm.

Cannon and Washburn had shown earlier that the sensation of hunger, the hunger pang, was associated with contractions of the empty human stomach; subjects who had swallowed ballons connected with writing tambours reported the onset of the hunger pangs.²⁶ Kymograph records showed that contractions and reports coincided. The theory of the cycles of activity seemed clear: a condition of deficit (empty stomach and depleted chemical resources) resulted in measureable tensions (stomach contractions, diffuse muscular tension, increased tonus and general irritability) which in turn were associated with conscious states (hunger, craving for food) and compensatory activities (food seeking) which finally culminated in eating, a full stomach, a sense of surfeit, relaxation. In this cycle the stomach muscles seemed to act as a mechanical starting and stopping device. Tsang's experiment, in which the stomach of the rat was reduced in size to a mere tube joining esophagus and intestines, supported this view; for with the

smaller stomach the periods of stomach contractions came with shorter intervening rest periods, and the period of need-tension during which the animal worked as an active learner was also reduced. Reaching a state of stomach distension more rapidly, the animal's food-getting drive was of shorter duration, but since the food-reserve was smaller, and the stomach emptied more rapidly, the contractions were resumed after a shorter interval.²⁷

There is some experimental evidence indicating that the chemical state of the blood stream is the prime instigator of activity, and that both stomach contractions and overt activity are secondary. Transfusions of blood from a satiated animal will inhibit contractions in the stomach of a starved animal. Operative techniques that disconnect portions of stomach or intestinal muscles from their nervous supply do not destroy the periodic contractions. Careful measurements in the intact animal also show that the *overt* activity in the striped muscles begins *before* the contractions of the smooth muscles lining the stomach wall.²⁸ Although the latter are keenly felt by human subjects, and although they may facilitate overt movements, the evidence suggests that some chemical factor operates directly upon the sensori-motor system, altering sensory thresholds, raising the tone of the musculature, and altering the general activity level.

Infant feeding rhythms Severing the umbilical cord at the birth of the infant initiates a cycle of deficit-tension-release which, for a period at least, transforms the routine of the average household. The baby's stomach, which can hold a few ounces at most, sets up strong contractions at the onset of a deficit, and the infant's wail reminds the family of this biological clock that has no respect for adult schedules. Primitive mothers had a simple solution for the problem. The child's appetite was the regulator, and no one thought of fixing the length of these intervals, or the amounts eaten at any feeding, any more than they would have thought of regulating his pulse or his breathing rate. They fed the infant when he cried and gave him as much or as little as he wanted. His schedule was a "demand-schedule."

A modern household has other tasks, and it is bound, in turn, within the framework of a clock-regulated civilization. Father needs his sleep if he is to make the commuter's special in the morning, and mother has a household routine to maintain. There is, moreover a medical science which understands the food requirements of a growing child, and it has made a study of the energy values of the common food sources in the bomb-calorimeter. The young mother, impressed by medical science, anxious to have

her child grow according to the charts, feeling somewhat insecure and inexperienced, anxious not to spoil the child (for he must be tough in this competitive world, and conform) and under the pressure of household duties and other interests, asks the physician for a schedule. "How often should he eat? When can the night feeding be given up? How much should he eat? When can I put him on the bottle? When should he eat solids?" Thus plans are laid to adjust a small stomach to the rhythm of a household and to the pattern of a culture

The adjustment is not a difficult one if it is managed by a secure parent whose first interest is the happiness and welfare of the infant, and who can use enough common sense to follow a flexible procedure. But when a rigid schedule is set up with reference to some external norm (and not to the needs of the individual child) and when the child is fed on a bottle where the unconsumed portion is clearly visible, feeding problems often arise. Obviously no physician can predict precisely how many ounces a particular infant should take at a feeding. Stomachs differ in size and in emptying time, infants of identical age and weight differ in basal metabolic rates, in amount of activity, in food requirements. Nor can a physician predict—beyond a roughly defined zone—when the child should be weaned, placed on solids, trained to feed himself; for maturing rates differ for every infant, and teaching techniques vary with every household. Procedures, to be effective, have to be flexible, adapted to the capacities and growth rates of the individual child. More frequently than not the physician's concern has to be directed toward the personality of the parent rather than toward the physiological needs of the child.

A CLINICAL CASE A pediatrician has described a family setting which illustrates this problem.²⁹ A father asked the physician for help with his three children, aged five, seven, and nine. They had always been fussy eaters; but during the year they had developed a vomiting technique which made mealtime a most unappetizing occasion. From interviews with the parents the physician concluded that he was dealing with a mother who had married what she believed to be a socially inferior husband. He did not share his wife's interests in the finer things of life (such as the poetry she both wrote and read). Many of the household tasks, including the laundry, awaited the husband when he came home from work, as a result of the mother's preoccupation with her intellectual and aesthetic interests. She was very conscientious in one matter, however. She took great care in the preparation of the children's food and in the supervision of the amounts they ate; and she had taken some pains to

make herself expert in these matters, studying books on the care and feeding of children. On one occasion one of the children, on whom she was forcing food, suddenly gagged, vomited. The mother's reflexes sympathetically duplicated his reaction. The other two children followed suit, and this became a mealtime routine. "One child vomited, then the mother would vomit and beat her head on the door, then the others would vomit and more head beating on the part of the mother would follow." The children became grossly undernourished. In hospital the medical examination was negative, apart from the undernourishment. They began to eat under hospital routine and gained weight rapidly. Home once more, the faulty eating habits were soon resumed. The family matrix was not one to promote growth or to support and reinforce normal physiological needs.

Self-demand schedules Recently many pediatricians have advocated a return to a demand-schedule, hoping to reduce the amount of stress surrounding feeding, a stress that can be so great—in some instances—as to adversely affect the whole physical and psychological development of the child. Experience seems to indicate that under these conditions the child's demands settle down to a regular rhythm. He sets his own schedule and there is a minimum of frustrating experience.

Davis has applied an extension of this same logic to the choice of the diet itself. Evidence of the type reported by Richter has shown that experimental animals will balance their needs for proteins, fats, and carbohydrates; there is a "wisdom of the body." Placing a tray before her little self-feeders (just weaned) Davis gave them their choice of milk, cereal, prunes, carrots, and so on. Food choices varied from child to child and from day to day. A spinach-spree at one meal would be corrected on a subsequent meal; and the total growth of the infants over the period of study actually exceeded the norms for these age levels. (Two were studied for 6 months, one for a year.) The roentgenogram of one child showed the signs of rachitis, and cod liver oil was added to his tray. He selected the oil voluntarily, omitted it after his blood calcium and phosphorus had become normal.³⁰ It should be pointed out that the child's trays contained no unpalatable, poorly prepared, highly seasoned foods; and there were no sweets, pickles, jelly, crunchy cereals, gravies, white bread.

Animal experimentation on self-selection indicates the need of caution. Even with pure and wholesome foods one third of a colony studied by Pilgrim and Patton grew at a subnormal rate (consuming too little casein).³¹ Physical texture, unpleasant taste, temperature, and the like, may

deflect the animal's choices away from those food sources that would supply his chemical needs most effectively. One study of the domestic fowl showed that an alfalfa meal containing all the essential vitamins was less preferred than an inadequate mash. Given no option the chicks grew normally on the alfalfa meal, but when given the option the chicks matured improperly, died. The wisdom of the body has distinct limits.⁸²

The Female Sexual Cycle

If we study the activity of the post-pubescent female rat we discover a four-day recurrent cycle of changes. There are peaks and troughs of general activity—as measured by the number of revolutions of the activity wheel attached to her cage; and these peaks and troughs recur with a tidal regularity. A sexually receptive period coincides with the peak of the activity cycle. (See Figure 23.) At the troughs she reacts to the advances of males with indifference or else fights off their approaches. This rhythm of activity and of sexual drive does not appear until the ovaries mature; it ceases with castration, at which time the activity level drops permanently. The cycle can be re-established by grafts of ovarian tissue or by injections of the female sex hormone. The control of the cycle is thus experimentally traceable to the ovarian tissues.

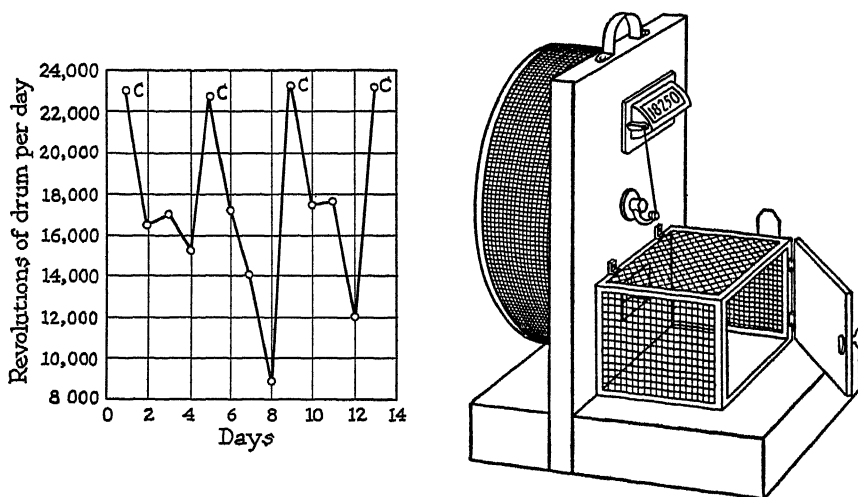


FIGURE 23. Four-day cycle of general activity in the female rat. Activity is measured by the number of revolutions of the wheel-shaped activity cage (at right). On the graph, peaks of activity (C) correspond with sexually receptive periods. [Graph from G. H. Wang, "Relation between 'Spontaneous' Activity and Oestrous Cycle in the White Rat," *Comparative Psychology Monographs*, 2, No. 6, 1923.]

Two hormones are involved in the control of this cycle. Up to the moment of ovulation when the mature follicle ruptures and releases the egg, the estrogen-containing follicular fluid is in control. Following the release of the egg the follicle undergoes regressive changes, the *corpus luteum* is formed from the cells lining the follicle, and progesterin is produced. There are changes in the vaginal mucosa and in uterine walls which are under the control of these hormones, and the periodic menstrual bleeding is the outward sign of these changes. Studies of the sex drive of the lower animals (including the primates) show that the maximum strength of the drive coincides with the period of ovulation and the peak of estrogen production. Yerkes and his associates, studying chimpanzee pairs, have shown that social relationships other than the sexual also fluctuate with the ovarian cycle.³³ Where the two animals are fed a favorite food via a food-chute which permits one animal to monopolize the supply, the usually dominant male will crowd his mate aside, permitting her to eat only when his own wants are satisfied, punishing her when she fails to recognize his priority. At the peak of her sexual receptivity she assumes (or he grants) the dominant position.

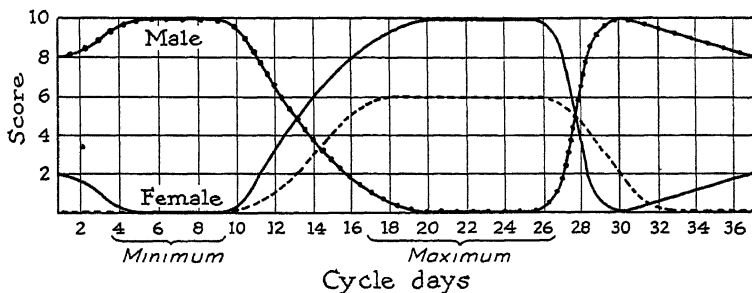


FIGURE 24 Diagram showing the relation of dominance and submission (of chimpanzee mates) to female sexual status. Higher scores indicate dominant status. The broken line indicates changes in genital swelling. "Minimum" indicates the phase following menstruation. "Maximum" indicates the peak of sexual receptivity. [From Yerkes, *Journal of Comparative Psychology*, p. 178.³³]

The existence of rhythmic changes in feminine behavior has also been suspected in human beings, and the literature is full of observations both introspective and objective. Mood changes, fluctuations in efficiency and energy output, variations in the impulse to be active, and in the more specific sexual desires, have been reported; but there are so many contradictions in the findings that a clear-cut summary is difficult. Careful measurements of efficiency of performance have failed to show the ex-

pected relationships. It is possible that the tests failed, on occasion, because the subjects have been able to achieve their usual maximum under the spurt of test-motivated effort, whereas subtler measures of mood (and disinclination toward activity) or longer and more life-like measures of output would have revealed fluctuations. It is apparent, in any case, that the endocrine cycle does not regulate overt human behavior to the degree that it controls the behavior of anthropoids and rodents.

Benedek and Rubenstein, using psychoanalytic interviews, found a fluctuation in the motivation of their patients which followed this endocrine cycle with almost complete fidelity.⁸⁴ While a psychiatrist recorded the daily interview materials, the physiological data (bodily temperatures, vaginal smears) were studied by a second investigator who had no access to the interview data. In 152 cycles of 15 women of childbearing age they found a remarkably complete correspondence in the two sets of predictions. The ovulative phase was as definitely indicated in the material of the interviews as it was in the physiological data. Under estrogen-dominance (follicular phase) there was an increase in heterosexual drive, in extrovertive tendencies; under progesterone (corpus luteum phase) the motivation was toward passive-receptive and narcissistic goals. Fantasies dominated by the wish for a mate in the first period were replaced by those that symbolized a wish for a child and by a special concern for her own bodily welfare in the second period. An intervening, late premenstrual phase was characterized by progesterone decline on the physiological side, while psychologically the interviews revealed eliminative tendencies, fantasies about childbirth, abortion, nausea, vomiting, and the like. The patient was more apt to be hypercritical of herself and of her role as a woman at this period.

The types of free-association and dream material varied widely with the level of psychosexual maturity, and with the whole life style of the individual. Many adults are still infantile in their sexual aims, and in this case the estrogen-motivated interviews showed corresponding infantile aims. In the case of a subject who was struggling against sexual impulses the rising tide of estrogen production introduced anxiety, conflict, and defensive measures; in the homosexually fixated individual, the fantasies reported concerned persons of the same sex.

Overt behavior is a less sensitive indicator of these covert changes. External, situational controls hold the human adult upon her course. Fantasies, on the other hand, fly ahead relatively unchecked. Perhaps it is for this reason that the Benedek and Rubenstein study has succeeded in showing closer relationships between the biological and psychological factors than has hitherto been found.

A SUMMARIZING DISCUSSION

Since man is an organism before he becomes a person, and since physiological homeostasis must be maintained if he is to live at all, it is common usage to speak of his physiological needs as primary, his social, ethical, and religious needs as secondary, as derived. The biological aims of security from harmful threats, of nourishment to compensate for chemical deficits, of rest that repairs his fatigued tissues, of a mate in whom he will find a way of achieving reproductive goals, have to find means of realization if there is to be any continuance of life, either individual or social.

Many of the experimental studies cited in the preceding pages have shown the method whereby secondary aims become grafted upon these basic motivations. The contiguous and accidental conditions under which release of tension occurs create subordinate goals which are demanded almost as insistently as the release itself. The overprotected child, John, seems almost to place his mother's affectionate attention *first* on the list of his needs. And this emphasis upon secondary aims is apparent in the adult social sphere as well. There is no biological craving for gasoline, yet gasoline means ability to move about, to follow an occupation, to participate in social activities, and driving a car in turn signifies the achievement of a certain minimal social status. Thus in Middletown during the depression years of 1929-1935 purchases of food declined markedly while gasoline sales remained at a near-normal level.³⁵ In this case the secondary motives are displacing the primary ones. When maintaining a standard of living (conspicuous expenditure) becomes more important than having a family, when getting the children into the dancing class is more important than providing them with nourishing meals, when the hunger-striker chooses to affirm his principles rather than to eat, when the patriot chooses to die rather than betray his countrymen, when the patient chooses to starve herself rather than to grow into womanhood, the so-called secondary motives are seen to be stronger than the primary roots out of which they developed; the person-as-a-whole—as formed by the culture—has become the regulator of the parts.

It is a foolish biology that begins with the conception of man as a solitary animal, abstracting a pure physiological motivation to serve as the basic fact in human behavior. Man is *not* solitary, nor did he evolve from solitary creatures. He could not live, as an infant, for a day, without guidance and protective care. He was not conceived in solitude. The secondary and primary aspects of human motivation are therefore abstractions from a totality

which could not exist as a purely solitary physiological machine. Some social needs must arise if there are to be any needs at all. Social relationships are as basic to our existence as food or shelter from the elements.

- There is a measure of validity in the distinction between primary and secondary needs, however, when we consider the plasticity of our social demands. The basic physiological demands are rather monotonous, and they do not tolerate too much tampering. The oxygen debt has to be paid off or nature will foreclose her mortgage. But whether we breathe the foul air of a prison or the pure oxygen of freedom—that is a human question and a social one.

When the minimum physiological needs are satisfied the things that really matter to human beings begin to happen. There is a larger orbit of life that is not a matter of balancing proteins, carbohydrates, and fats; nor does this orbit find its regulation in tensions within seminal vesicles, estrogen or testosterone contents of the blood stream. The brief cycles of tension and release, of hunger and surfeit, the endocrine tides of estrogen-progestin, estrogen-progestin, beat out a monotonous rhythm, like the hands of the grandfather clock.

Somewhere at a level above the physiological one, at a level where persons adjust to persons, *human* life begins. The interpersonal realm is intimately integrated with the level of physiological needs. Each level penetrates the other, and neither can function without the other. Indeed, the highest levels of human behavior may collapse under pressures which arise from frustrated biological needs. But to attempt to derive human goals from physiological needs, when the latter are conceived of as a set of chemical deficits in an oddly shaped living test tube isolated from all similar tubes, is to create a conception of man that is neither human nor true.

REFERENCES

1. E. Kretschmer, *Physique and Character* (Harcourt, Brace & Co., Inc., 1925).
2. W. H. Sheldon and S. S. Stevens, *The Varieties of Temperament* (Harper & Brothers, 1942).
3. P. W. Fiske, "A Study of Relationships to Somatotype," *Journal of Applied Psychology* (1944).
4. Curt P. Richter, "Biology of Drives," *Psychosomatic Medicine*, 3 (1941), pp 105-110.
5. Lawson Wilkins and Curt P. Richter, "A Great Craving for Salt by a Child with a Cortico-Adrenal Insufficiency," *Journal of the American Medical Association*, 114 (1940), pp 866-868.
6. Richter, "The Internal Environment and Behavior," *American Journal of Psychiatry*, 97 (1941), p 878.
C. P. Richter, L. E. Holt, Jr.; B. Bareclaire, Jr., and C. D. Hawkes, "Changes in Fat, Carbohydrate, and Protein Appetite in Vitamin B Deficiency," *American*

Journal of Physiology, 124 (1938), pp. 506-602

7. E. Gellhorn, *Autonomic Regulations* (Interscience Publishers, 1943), p. 51.

8 Alfred Adler, *The Neurotic Constitution* (Moffat, Yard & Co., 1917)

——, *The Practice and Theory of Individual Psychology* (Harcourt, Brace & Company, 1924).

9. L. W. Sontag and George Comstock, "Striae in the Bones of a Set of Monozygotic Triplets," *American Journal of Diseases of Childhood*, 56 (1938), pp. 301-308.

L. W. Sontag and V. L. Nelson, "Comparison of the Physical and Mental Traits of a Set of Monozygotic Dichorionic Triplets," *Journal of Heredity*, 34 (1933).

—— and V. L. Nelson, "Part II. Behavior of a Set of Identical Triplets," *The Pedagogical Seminary and Journal of Genetic Psychology*, 42 (1933), pp. 406-422.

10. Carney Landis and M. M. Bolles, *Personality and Sexuality of the Physically Handicapped Woman* (Paul B. Hoeber, Inc., 1942).

11. C. J. Warden, *Animal Motivation: Experimental Studies on the Albino Rat* (Columbia University Press, 1931).

12. F. A. Beach, "Effects of Hormones upon Behavior of Animals," *Psychosomatic Medicine*, 7 (1945), pp. 46-50

13. P. Lazarsfeld, "An Unemployed Village," *Character and Personality*, 1 (1932), pp. 147-151.

14. Ralph Linton, *The Study of Man* (D. Appleton-Century Company, Inc., 1936).

15. F. A. Beach, "Analysis of the Stimuli Adequate to Elicit Mating Behavior in the Sexually Inexperienced Male Rat," *Journal of Comparative Psychology*, 33 (1942), pp. 163-207.

16. Beach, "Analysis of Factors Involved in the Arousal, Maintenance and

Manifestation of Sexual Excitement in Male Animals," *Psychosomatic Medicine*, 4 (1942), pp. 173-198.

17. Jules Masserman, *Behavior and Neurosis* (University of Chicago Press, 1943)

O. D. Anderson and Richard Parmenter, "A Long-term Study of the Experimental Neurosis in the Sheep and Dog," *Psychosomatic Medicine Monographs*, Vol. II, Nos. 3 and 4 (1941)

——, and H. S. Liddell, "Observations on Experimental Neurosis in Sheep," *Archives of Neurology and Psychiatry*, 34 (1935), pp. 330-354.

——, Parmenter, and Liddell, "Some Cardiovascular Manifestations of the Experimental Neurosis in Sheep," *Psychosomatic Medicine*, 1 (1939), pp. 93-100

Liddell, "The Experimental Neurosis and the Problem of Mental Disorders," *American Journal of Psychiatry*, 94 (1938), pp. 1035-1043.

18 David Levy, "Experiments on the Sucking Reflex and Social Behavior in Dogs," *American Journal of Orthopsychiatry*, 4 (1934), pp. 203-224.

19. Robert R. Sears and George W. Wise, "Relations of Cup Feeding in Infancy to Thumb-Sucking and the Oral Drive," *American Journal of Orthopsychiatry*, 20 (1950), pp. 123-138.

20. J. McV. Hunt, "The Effects of Infant Feeding-Frustration upon Adult Hoarding in the Albino Rat," *Journal of Abnormal and Social Psychology*, 36 (1941), pp. 338-360

21. J. McV. Hunt; Harold Schlosberg, R. L. Solomon; and Eliot Stellar, "Studies of Effects of Infantile Experience on Adult Behavior in Rats. I Effects of Infantile Feeding-Frustration on Adult Hoarding," *Journal of Comparative and Physiological Psychology*, 40 (1947), pp. 291-304.

22. David Katz, *Animals and Men: Studies in Comparative Psychology*

(Longmans Green and Company, 1937), pp 159-165

23. Jules H. Masserman and Paul W Siever, "Dominance, Neurosis, and Aggression," *Psychosomatic Medicine*, 6 (1944), pp. 7-16

24. O. H. Mowrer, "Animal Studies in the Genesis of Personality," *New York Academy of Science*, Series II, 3. No. 1 (1941).

25. Richter, "Behavioristic Study of the Activity of the Rat," *Comparative Psychology Monographs*, 1, No. 2 (1922).
——, "Animal Behavior and Internal Drives," *Quarterly Review of Biology*, 2 (1927), pp 307-343.

26. Walter B. Cannon and A. L. Washburn, "An Explanation of Hunger," *American Journal of Physiology*, 29 (1912), pp. 441-456.

27. Y. C. Tsang, "Hunger Motivation in Gastrectomized Rats," *Journal of Comparative Psychology*, 26 (1938), pp. 1-17.

28. A. B. Luckhardt and A. J. Carlson, "Contributions to the Physiology of the Stomach. XVII. On the Chemical Control of the Gastric Hunger Mechanism," *American Journal of Physiology*, 36 (1915), pp 37-46.

——R. D. Templeton and J. P. Quigley, "The Action of Insulin on Motility of the Gastro-intestinal Tract, II," *American Journal of Physiology*, 91 (1930), pp. 467-474

M. H. Powelson, "Gastric Transplantation," *Science*, 62 (1925), pp. 247-248.

29. John A. Rose, "Eating Inhibitions in Children in Relation to Anorexia Nervosa," *Psychosomatic Medicine*, 5 (1943), pp. 117-124.

30. C. M. Davis, "Self-Selection Diets by Newly Weaned Infants," *American Journal of the Diseases of Children*, 38 (1928), pp. 651-679.

31. Francis J. Pilgrim and R. A. Patton, "Patterns of Self-Selection of Purified Dietary Components," *Journal of Comparative Psychology and Physiology*, 40 (1947), pp 343-348.

32. Charlotte I. Jukes, "Selection of Diet in Chicks as Influenced by Vitamins and Other Factors," *Journal of Comparative Psychology*, 26 (1938), pp 135-156.

33. R. M. Yerkes, "Conjugal Contrasts among Chimpanzees," *Journal of Abnormal and Social Psychology*, 36 (1941), pp 175-199.

——, "Social Dominance and Sexual Status in the Chimpanzee," *Quarterly Review of Biology*, 14 (1939), pp 115-136

——, "Sexual Behavior in the Chimpanzee," *Human Biology*, 11 (1939), pp 78-111.

——, "Social Behavior of Chimpanzees: Dominance between Mates, in Relation to Sexual Status," *Journal of Comparative Psychology*, 30 (1940), pp 147-186.

——, "The Sexual and Reproductive Cycles of Chimpanzees," *Proceedings of the National Academy of Science*, 22 (1936), pp. 276-283.

——, and James Elder, "Oestrus, Receptivity, and Mating in Chimpanzees," *Comparative Psychology Monographs*, 13 (1936), No. 5, pp. 1-39.

34. Therese Benedek and Boris B. Rubenstein, "The Sexual Cycle in Women," *Psychosomatic Medicine Monographs*, Vol. III, Nos. I and II (1942), pp 1-306

——, and Boris B. Rubenstein, "The Correlations between Ovarian Activity and Psychodynamic Processes," *Psychosomatic Medicine*, 1 (1939), "I The Ovulatory Phase," pp. 245-270, "II The Menstrual Phase," pp. 461-485.

35. Robert S. Lynd and Helen M. Lynd, *Middletown in Transition* (Harcourt, Brace & Co., Inc., 1937).

CHAPTER 8

The Emotions

As we look about the circle of our acquaintances—even when we know far too little about them to sense a general life style—we can see a certain quality in their responses. One preserves an unruffled poise: like da Vinci's *Mona Lisa* she observes the antics of this simian world with enigmatic smile. Another is as lively and unexpected as a string of fire-crackers, exploding in unpredictable bursts of gesture and speech, jumpy, excitable. A third is subject to recurrent bouts of depression in which all of his movements are slowed: Hamlet-like he then finds all the uses of this world weary, stale, flat, and unprofitable.

These differences in the tempo and style of expression, these elevations and depressions of mood, are such striking features of human behavior that they have always occupied a fairly central position in any system of psychological thinking. In their most dramatic form, the epileptic seizure, the stream of behavior is completely disrupted and consciousness is blotted out; there is not even a memory trace for the attack. And in the prolonged psychotic depression it is as though some alien force or spirit had descended upon the individual, slowing the body's machinery with its choking grasp and filling the mind with fear, guilt, hopelessness, or a sense of impending disaster.

In order to sharpen our vision and to raise essential problems let us examine three studies of emotion: a clinical study of a person suffering from "war neurosis" and two laboratory studies of emotional expressions under standard conditions.

A Clinical Study of Emotions: A Case of Claustrophobia

A case reported by Dr. W H R Rivers out of his experience in World War I will serve to illustrate the difficulties confronting the physician who has to evaluate the emotional factors involved in his patients' difficulties ¹

The patient was a young officer of the Royal Army Medical Corps, thirty-one years of age, invalided home from Flanders where he had suffered a breakdown. Rivers met him in hospital in London where he had been placed on a routine rest cure, with hypnotic drugs administered each evening to counteract insomnia. Beyond these drugs the therapy had consisted mainly of an adequate diet, rest, relaxation. Each night the officer was tormented by dreams of the fighting and wakened from his nightmares sweating, full of fear, and the dreams were so disturbing that he was afraid to fall asleep. Stammering, which had bothered him at an earlier period—but which had almost disappeared—now returned. He found it impossible to read or to concentrate and his memory for recent events was somewhat confused and impaired. The neurological tests showed that his reflexes were exaggerated (indicating persistent neuromuscular tension) and he suffered from headaches and intestinal disturbances.

At the outbreak of the war he had just completed his medical training, and he joined the medical services. Shipped to France immediately, he was attached to an infantry unit which was moving up to the front line. The combat area produced a quantity of fear and anxiety that proved more than he could master. In particular, life in the dugout revived and intensified an old fear of closed spaces. When he first entered the shelter he noticed a shovel in the corner, and the reply to his question about its purpose—which indicated that it was to be used in case the occupants were buried alive—gave vivid form to his fears. He could not sleep, and spent the night walking about under the stars instead of trying to rest in the stuffy and suffocating dugout. His general condition grew so bad that his commanding officer sent him down to the base, where he was hospitalized.

Questioned about his childhood, he told Rivers that his fear of closed spaces had existed since the age of five or six, but that he had never realized that he differed so much from others until the dugout convinced him of its intensity. He had felt it in going down into a coal mine, riding through a tunnel on a train, in the subway; and in the movies he had always chosen a seat near the exit. He imagined that the sense of being confined, which prisoners must experience, would be torture. Occasionally he had experienced nightmares of being buried alive (prior to the war experience). At 12 years of age the stammering and insomnia had been disturbing symptoms.

Continued probing brought back early memories of a box-bed, built into the wall. When the doors of the recess were closed the bedroom became a sitting room. In this bed the boy and his brother slept, the patient sleeping on the inner side next to the wall. He could recall lying awake in terror, wondering if he could escape if the need arose.

The physician's questionings along the line of closed spaces seem to have stirred up other memories, for within a few days his dreams turned in this direction; and as he tried to relate these dreams he suddenly remembered an incident that had occurred when he was but three or four years of age. He had taken a piece of junk to an old "rag and bone" merchant who was in the habit of giving boys a halfpenny for whatever they found. In making his way out of a dark, narrow passageway, he discovered that the door was shut. The doorknob was too high for him to reach, and the merchant's dog started to growl at him as he was trying to open the door. Although the episode had been completely forgotten in the intervening years, it now came back, arousing such vivid emotion and accompanied by such a clear recall of details that it might have occurred a day or so before the dream. Inquiry brought a confirmation of many details from the patient's parents. Thus the trail of recall led from the dugout, to the experience in mines, tunnels, movies, and thence to the box-bed, and finally to the dark passageway and the growling dog at the junk dealer's.

We can see in this case report a number of aspects of the problem presented by the emotions. Chronic and intense fear and anxiety can impair health, bring a return of old difficulties (stammering). The entire bodily economy is thrown out of gear; psychological functions are impaired. Emotions can be disruptive. They can also be very useful. Darwin, approaching the problem with his theory of natural selection, was able to indicate their adaptive value to such a degree that he felt that he had explained their existence. The modern physiologist is inclined to take this lead also; and he points out their role in liberating energy, speeding up the circulation, increasing the oxygen supply. In Rivers' case the conflict between the war-engendered fears and the patient's sense of the kind of conduct permitted an officer and a gentleman mobilized an "alarm reaction" with all its impulses to escape, its neuromuscular tensions; but this set of emotional responses incapacitated him for duty. As the whole syndrome operated in this setting, it also provided him with a legitimate way out of the impasse, since it enabled him to escape and to save face at the same time. Perhaps this function was not a part of the causes for the symptoms, but it could very well operate to prolong the symptoms since, with recovery, the threat of being returned to duty would appear. These considerations should

remind us that a single functional description of emotions (that they are disruptive, adaptive, or that they add to the gayety and joy of life—as they do) is probably worthless.

The case also shows a continuity of emotional problems from early childhood to adulthood. There is a tendency, in Rivers' account, to load the one experience very heavily, to organize all of the data around the junk-dealer episode. But he also reported that as a child the patient had had scarlet fever, enteric fever, abscesses in the shoulder, pleurisy, abscesses in the foot. Did the series of illnesses affect the family's view of him, his own notion of his strength, and his maturing as a person able to fight his own battles? Did the injuries and illnesses leave him physically impaired, and hence more susceptible to any press? His student days had not gone smoothly. Reading for his examinations he had been troubled by insomnia, inability to work; and he came very near to giving up his profession altogether, in his second year. Later, as house surgeon, he suffered a breakdown and had to be placed on light work for nine months. There are several causes suggested here: an impaired constitution, an immature life style, a recurrent tendency to seek escape in illness when pressures mount. In the light of these possibilities the single cause is not too convincing.

The report of the case also indicates that the data an interview reveals may possibly be determined by the line of questioning. As a matter of fact another physician had treated the patient for similar symptoms a half dozen years earlier. Trained in Vienna this therapist followed the theories of Freud, persuaded the patient that his difficulties had sexual roots, studied his dreams. The data that would be given to us in this earlier report were different from those presented by Rivers, who questioned him along the line of closed spaces (and whose own theories stressed the importance of anxiety and the impulse to self-preservation).

A final implication should be emphasized. Under Rivers' tutelage the patient became convinced that *the* cause had been discovered and that he was now fully recovered. His worst symptoms disappeared. He began to attend movies sitting in the middle of a crowded house without anxiety; and he asked to be locked in some subterranean vault so that he might prove that he was completely recovered. He travelled through tunnels, descended into a mine, and asserted that he had completely overcome the phobia. In the place of his terrifying dreams of being buried alive he now dreamed of lying in a narrow cell with a bloodhound, and he was completely happy and comfortable. The recovery of the forgotten memory, and the interpretation, implies to the patient: "Don't you see that you are reacting to closed spaces just as you did as a three-year-old when you found yourself in the passage

with the brown spaniel? Now that you are a man and realize the childish nature of your fears you will, of course, be able to face these situations without qualms ”

Rivers does not tell us that the officer returned to the front line. He does state that his stammering and general nervousness were not entirely cured; and he continued to sleep badly The follow-up data are not precise, the causes are multiple and selectively organized (but in no sense proved), the theory of the investigator has guided the collection of data Although the “story” may have an authentic ring, we would like to see other (and possibly more rigorously controlled) evidence, something that is measureable.

An Experimental Study of Facial Expression

In looking at a case we tried to view the emotional response as a part of a life style, as the outgrowth of a history, as a function of the effort to adjust to a very complex real-life setting As we turn to the experiment we find the problem formulated in terms of *stimulus* and *response*: the laboratory conditions are controlled (identical stimuli—as physical objects—are presented to each subject), the responses are measured, the individual is replaced by a sample of a college student body

A number of earlier studies had shown that facial expression of posed photos (when the models had been instructed to portray emotions) could be correctly read in a fraction of the cases. Laughter was identified in about two thirds of the instances, pain in half of them, and disgust and fear in but a third In a series of studies investigators had tested the effect of age and experience of the judge, the number of categories used in classifying the emotions, the effect of a knowledge of facial anatomy, and so on The studies had cast some doubt about whether there were any fixed patterns of expression

In an effort to secure fresh evidence on the question and to study actual rather than posed expressions, Landis photographed subjects whose emotions were experimentally induced by such acts as reading the Bible, inhaling ammonia, describing an embarrassing situation, listening to jokes, looking at pictures of skin diseases, reading case histories of sexual aberrations, looking at pornographic pictures and “art studies” of nudes Electric shocks were given to the subject when he reached into a pail containing three live frogs The faces of the subjects, lined with greasepaint, became the objects of critical study.

Instead of discovering typical expressions for each situation, or for each reported emotion, Landis found that his subjects tended to show a characteristic pattern of contraction for all states and situations.² It was as though the

response were to the larger interpersonal situation (being photographed while a psychologist makes you feel foolish) or a mask-like expression which so many appear to wear when they pose for a picture. When he asked three of his subjects to "register" certain emotions they had reported previously, the patterns seemed to communicate what was intended, but when the patterns were compared with those the subjects had actually shown when reporting that they were experiencing these same emotions, there was little resemblance.

Brunswick's Measurement of Gastrointestinal Changes

We can readily understand how a subject might conceal emotions that were felt (both in his facial muscles and in his verbal report); for each of us has, on occasion, felt the need of doing that. But there are other responses over which we have less control. The flush of embarrassment steals over our face in spite of us, the dry mouth troubles the speaker (even though he may deny awareness of fear or anxiety), and appetite leaves us without our bidding. Brunswick was interested in one group of these automatic responses—contractions of stomach and intestinal musculature under emotional stress.

The study had for its background the observations of Cannon and Washburn reported earlier (see page 192). Using a similar balloon technique and adding to the one in the stomach similar recorders of contractions in the duodenum (the intestinal passage just beyond the stomach) and in the rectum, he studied reactions to pistol shots, foul odors, shocks, embarrassing passages from letters belonging to the subject, and the like. Ten subjects studied in 28 tests gave some indication of a roughly defined pattern. Fear seemed to lower the gastrointestinal tone; surprise and startle commonly showed an increase. Variations, however, were numerous. A subject might name his experience as fear, or surprise, and the changes fail to correspond to the trend. Other states (envy, disappointment, irritation, pain, unpleasantness) also showed the *same* lowering of muscular tension. (After all, there are but three possibilities for the muscles: to contract further, to remain unchanged, to lose tone [that is, relax].) The emotions are multiform and complex; the neuromuscular elements [and the glandular] have limited possibilities.)

Brunswick did not find any subject who reported anger. (Some of these cooperative subjects would have reacted to the same objective stimuli in another setting with something quite different from their philosophic calm.) No stimulus evoked uniform reactions in all of his subjects. The correlations between tonus and conscious state, observed on a given day with a particular subject, were sometimes lacking on the following day.

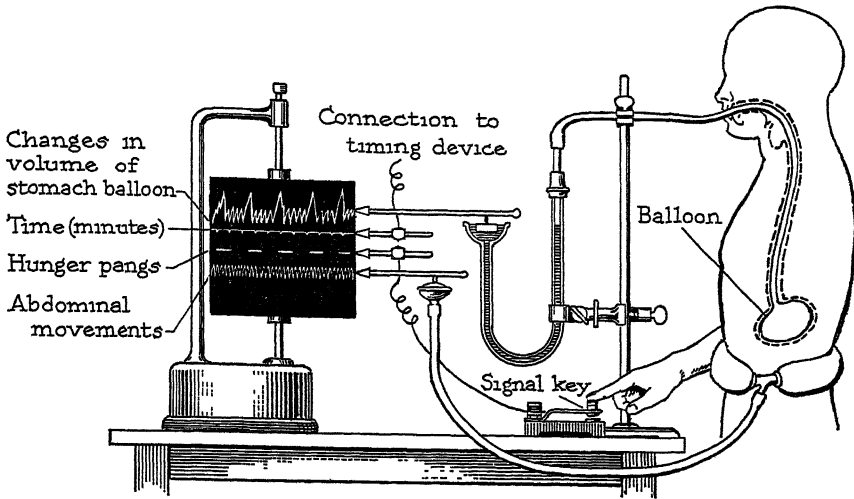


FIGURE 25 Apparatus for recording stomach contractions, similar to Brunswick's apparatus. While the record of stomach movements is being made, the subject is asked to report pangs of hunger (by pressing a key). Reported pangs are found to coincide with strong contractions of the musculature of the stomach walls. [Based on W. B. Cannon, "Hunger and Thirst," in C. Murchison (ed), *A Handbook of General Experimental Psychology* (Clark University Press, 1934), p. 250. For Brunswick's experiment, see David Brunswick, "The Effects of Emotional Stimuli on the Gastrointestinal Tone," *Journal of Comparative Psychology*, 4 (1924), pp. 19-79, 225-287.]

Problems Posed by the Experimental Studies

Whether we look at the overt facial expressions or at the internal gastrointestinal responses, the experimental evidence fails to indicate the existence of stereotyped patterns in specific muscle groups, patterns that can be neatly correlated with specific objective stimuli or with a specific type of reported emotional experience. We are not surprised to find that the facial musculature—like our words—can be deceiving as well as revealing. As in other forms of language movements, these muscle groups fall under the control of our general intent; and sometimes our intent is to defend ourselves, to conceal, to mislead. Originally, as in the inexperienced infant, the cry and the smile have a more immediate and reflex quality; and in the expressions of the blind child, whose lack of vision has given so little opportunity of learning to conform, to imitate, we can see these patterns burst through when joy and sorrow strike. In the self-conscious and sophisticated adult a network of controls has subordinated and broken up these reflex units, and they are

shaped by the interpersonal needs of communication and by the shared understanding of the meaning of the situation

It is more surprising to see that this same break-up and reorganization process extends to those glandular and visceral responses which are so difficult for us to control. There is an internal "organ-language" as well, a language that reveals the subject's way of conceiving a situation, his pattern of needs, the history of his previous need-expression. What is tension-inducing for me may not be so for you. And even when one of us uses the *same names for the situation* (reporting fear, rage, disgust as *experiences*) the experimental evidence indicates that *my* fear, rage, and disgust are not like *yours*. Objectively they are not, the kymograph record shows it. The subjective experiences are more difficult to match, and the more we try to verbalize these, pulling up the associated memories, placing the acts within the pattern of our aspirations, the more they will differ. In one case the reported fear may have a strong admixture of aggression (not sensed by the one who reports) with cardiac acceleration, a tensing of the biceps for counterattack, an increase in gastrointestinal tone, a flushing of the face. In the other the fear involves a complete loss of gastrointestinal tone, a congestion of the mucous lining of the air-passages in the lungs, a weakening of the general muscular tone, and this also is reported as fear.

How complex our problem has become is apparent when we list the variables we have isolated.

1. *The objective situation* (the electric shock, the snake in the bucket)
2. *The subject's way of defining the situation* The philosophic subject takes the stimulus as a part of a scientific quest; in this situation he can scarcely be embarrassed or insulted. The physician sees the pictures of skin diseases as "beautiful cases." The young woman feels resentment at "being pushed around" by the young male graduate student and is determined that she will neither show nor report fear. This datum is seldom adequately recorded.
3. *The emotional consciousness* This is never a datum for anyone save the person who is both subject and observer, except by inference. Such an awareness, if it could be fully reported, would conceivably contain the sensory awareness of bodily cramps as well as awareness of actions intended (the means of liquidating the tensing situation), awareness of the stimulating conditions from without, awareness of similar situations called up from the past, and so on. The attempts to single out some fraction of this totality for introspective study fail for two reasons: (1) no such element exists in isolation, nor, if an element could be found, would

it truly represent our actual emotional experience; and (2) the contemplation of states of awareness is something else again. Emotion evaporates before our inward vision like darkness under the beam of the flashlight.

4. *The verbal report* From the experiments of Landis and Brunswick it becomes apparent that the name which the subject assigns to his state sometimes refers to *the situation*, sometimes involves the *experimenter* (as when the subject names what he wishes the experimenter to believe that he experiences), sometimes refers to his emotional consciousness (which might involve reporting sensations of visceral change, muscular tension, an intended act, a past event, a desired goal). It would appear that all verbal reports are ambiguous unless subjects have been put through standard training situations in which their attention has been turned repeatedly to the precise aspects of the situation the experimenter wishes them to observe. The request to report his "emotional consciousness" is clearly an ambiguous one.
5. *The overt expression* (for example, the contractions of facial muscles, the postural changes, the overt acts, speaking, shouting, crying)
6. *The autonomic response* (sweating, pupillary dilation, contraction or relaxation in the gastrointestinal tracts, constriction or relaxation of blood-vessel walls, glandular action, and the like).

The term *emotion* is thus seen to be loosely attached to a half-dozen variables. It is a "what-happens-when" kind of entity, and since so many things are happening simultaneously, and since our words tend to be loosely applied—now to one phase of the reaction and now to another—and since there are such poor correlations between the different aspects of this totality (Landis found that no two of the variables were highly correlated) any generalizations about emotional responses must specify the precise data that are referred to. Perhaps we should write

Emotion	Emotion
autonomic	verbal report

EMOTIONS IN THEIR LARGER SETTING

It is the whole self-system—the organization of needs, expectancies, and hopes—that responds emotionally. Instead of attempting to abstract an element from the onflowing behavioral stream, some reflex-like response to a local stimulus, we need to view emotional behavior in terms of cycles of activity which are continually rising and falling, meeting with frustration or flowing toward pleasurable consummation.

When Hamlet ponders his "to be, or not to be", and asks,

Whether 'tis nobler in the mind to suffer
The slings and arrows of outrageous fortune,
Or to take arms against a sea of troubles,
And by opposing end them?

he indicates a relationship between skilled actions and the liquidation of emotional tension that we should keep before us; and Hamlet's difficulties remind us, too, that not all of our barriers lie in the outer world. There are inner barriers

Viewed in terms of the larger life-setting, emotions are symptoms that indicate how the cycles of need—tension—release are unfolding *The emotions do not make the cycle go* any more than the glowing bulb makes electrons flow, they *are* the flow Viewed subjectively the emotions are the felt anxieties, the mixtures of hope and fear as we feel that we have a fighting chance, or they are the joy of consummation and relief which signalize the completion of the cycle Viewed objectively, they are the dry mouth, the enlarged pupil, the pounding pulse, the tensed muscles, the hesitant and varying acts directed at or around barriers and means-objects, the sigh and relaxation as the goal is reached Or, as in so much of human behavior, where means and ends are separated and overt expression is inhibited, they are the checked muscular expectancies existing in covert form, hinted at by flushed face, tensed muscles, or vocal tremor

Since our behavior-cycles do not unfold singly, with precise and isolated relationships between needs, ways and means, and goals, the psychologist entering to observe rarely finds anything approximating a pure emotion He finds, instead love mixed with irritations, disgusts, fears; hate mingled with pity, guilt, and understanding, fear mixed with aspiration and desire to be courageous Again we should be on guard lest we make conflict between need-systems the *cause* of our emotion, these combinations of conflicting needs, frustrations, consummations *are* the emotions When we consider the complexity of these kaleidoscopic combinations, together with the fact that unique constitutions and unique personal histories enter the laboratory where we try to measure them, we shall not be surprised to discover that our experimental studies have not isolated clearly defined and objectively identifiable contents which conform precisely to our conceptual categories. The experimental evidence does not provide us with the basis for a simple "push-button" psychology in which there are a fixed number of emotions and a neatly repetitive set of stimulus-response relations.

And it is worth noting, too, that even as a human being cannot escape

living with others, he must also live with himself. This can be painful at times, particularly if—unlike the psychopathic personality—he possesses a well-organized set of plans along with a “better self,” with standards and goals. The family and the tribe that nourish him also teach him the concepts of “the good life” and “the good man.” And as they build these standards within him they indicate the terms on which he can hope for human roles that bring peace of mind.

And human love needs human meriting:
How hast thou merited—
Of all man’s clotted clay the dingiest clot?³

In our loneliness and imperfection we feel our shortcomings; our performance does not come up to these standards. This is a behavior-cycle that is never solved. Relentlessly our steps are dogged with the sense of imperfection, defend ourselves as we may. We may say, look at *that* one, he is worse than I (trying to lay upon the scapegoat our personal guilt). We may rationalize and justify (trying to put a gloss on our performance, describing it as well-intentioned, or projecting the blame for its imperfection upon others, upon conditions). Or we may seek escape from all awareness of such painful comparisons, in ceaseless activities we crowd out all thought, in company with “birds of a feather” we seek to drown the sense of our shortcomings in merry conversations with our peers. Or, we seek adventures so exciting as to leave no room for thought. Sometimes we seek escape into life, into action, into anything that will blunt and deny the source and origin of our pain. Sometimes, too, we attempt to dissolve the pain chemically, in alcohol, or even in simple sedatives, choosing the oblivion of sleep in preference to the poignant awareness of our deepest needs.

All these, and utopian dreams, we utilize to quench the thirst for wholeness, for the fulfillment of the task of self-realization. Our religious myths, which stir within us some of our most profound disquietudes, also serve to assuage our discontent. If, as Thompson wrote, “human love needs meriting,” at least, we say, there is One whose compassion overlooks our faults. As a father pitieth his children . . . Out of the experience of a warm and protective love in our childhood we have constructed both a need for and a belief in an ideal love.

So viewed, the understanding of emotions requires a sense of life as a whole. They must be seen as phases in and as outgrowths of the entire course of development.

INFANCY AND CHILDHOOD: EMOTIONAL CONSTELLATIONS TAKE SHAPE WITHIN A FAMILY FRAME

Early childhood influences can be overemphasized. Overwhelming pressures, chronic frustrations and genuine guilt, arise in the most stable adult. It would be a foolish psychology that blamed everything upon the past. Nevertheless, the foundation of a great many of our "sensitive areas" where our acts are prone to suffer breakdown under pressure is laid down in infancy and early childhood. And it is easy to see why this must be true; for the pressures are many and the ways of meeting them are as yet undeveloped. In the early months of infancy the child's utter helplessness places an absolute requirement upon those responsible for his care. He must be protected from impersonal physical agencies, he must be fed, bathed, carried about. His needs must be anticipated, and his wants provided for, he is not even ready to learn the skills that will eventually make him independent. Not for two and a half decades will his physical growth be complete; and in the more complex civilizations of modern times—particularly in the democracies, which expect the individual to achieve a high degree of autonomy and to participate in the control of the state—his growth in the skills and understanding required for his role takes even longer.

The Genesis of Insecurity

The task of the home in our society may be described as one of preparing the individual for autonomy and for social participation. From the state of utter helplessness in which the protective role of the home is absolute, the child must develop to the point where he operates under his own power, sets his own goals, selects the means of achieving them, and participates freely and easily in the forms of "antagonistic cooperation" our society has developed.

Among the Zūñi and the Samoans, with their extended family groups and their network of communal enterprises, the process of development is slow and easy. Since there is less competition and less individuation of roles at the final stage, the drive toward autonomy, toward power-within-the-individual, is much less intense. In a sense the broader social group is always there in the background as a supporting and protecting influence. In our own society, particularly in the more competitive and socially mobile sections of it, the pressure toward autonomy, toward the development of skill-in-competition, is very great; and the role of the home in guiding the transition

from dependence to autonomy is crucial. And with the increase in this pressure the concern about the rate of development of the child's skills intensifies; for this rate of development determines the relationship between the child and his age-peers. To the ambitious parent it seems to foreshadow the adult role (dominance or submissiveness) in a competitive society.

Parents differ widely in the type of guidance they provide; and this is an inevitable consequence of the fact that they are different *persons*. They have their own organized needs, their own life style, into which the child fits. One parent may be keenly conscious of an incomplete career, some educational deficiency, some unsatisfied ambition. Another parent carries scars originating from certain conditions in his own childhood—conditions from whose baleful influence he is determined to protect his own child. And so these parents proceed to use their children as extensions of their own personalities, attempting to set their goals and to stimulate them to develop the skills required to achieve them. No parent escapes this role altogether. Some parents carry the process to a disastrous limit, almost destroying their child's chance of happiness. Just as we saw, in our discussions of the prenatal stages of development, that the organism of an occasional mother will borrow chemicals from the developing fetus, in order to make good the deficits in the maternal blood stream, so at a later stage the parents may borrow from the life-careers of their children to make good their own personality deficits.

Such parental control affects the life style of the offspring, and in doing so radically alters the course of emotional development of the latter. In order to show how basic, how universal this parental factor is, let us begin by observing two lower-animal mothers.

Two sorts of mothers Two monkey mothers (macaques) were observed by Tinklepaugh and Hartman.⁴ One was described as an affectionate and tractable animal, demonstrative, solicitous, mild-mannered. The other was somewhat nervous, irritable. Both had given birth before; both were in good physical condition and of approximately the same ages. The attitudes of these two mothers toward their offspring were as different as their personalities. The affectionate one (Emma), strongly maternal, was virtually a slave to her infant. The irritable mother (Rosie) was bound to her offspring by a more tenuous bond; and her general policy was either to ignore the infant or to force him to conform to her own needs.

When Emma's baby squirmed in discomfort, she would adjust her own posture until it was quiet; but Rosie would cuff the infant or jerk it into the position *she* fancied. If Emma's baby wandered into a dangerous position (for example, at the edge of the shed on which they were perched) Emma

would fly to rescue it, drawing it back to a position of safety. Rosie, on the other hand, seemed to ignore her offspring under these circumstances, and remained calm and indifferent. If Emma's baby attempted to sample the food thrown into the cage she would either (1) pull the infant away from the food again and again, (2) remove the infant to the far corner of the cage, away from temptation, or (3) take the food herself. Rosie, in the same situation, drew her child to her forcibly; and if the infant persisted she would take him in her arms and jump up and down violently, forcing him to cling to her. If he loosened his grasp she would repeat the "shaking"

The two infants soon began to behave differently Emma's child was timid, dependent, non-aggressive, quick to flee to the protecting maternal arms. Rosie's baby became bold, venturesome, independent, assertive, self-sufficient. Two life styles, two sets of needs and demands, and two corresponding sets of emotions have developed out of these two sets of mother-infant relationships.

A study of maternal overprotection David Levy selected for intensive study 20 cases from a file of more than 2000 case histories at the Institute of Child Guidance (New York) ⁵ In each of these cases there was evidence of (1) excessive contact between mother and child, (2) prolonged infantilization and dependence, (3) prevention of formation of normal social contacts outside the home, and (4) atypical maternal control. The cases were extremes, selected in the hope that an intensive study of maternal overprotection, "in pure culture," might reveal the regulative factors, and in the hope that these caricatures of the mother-child relationship might sharpen the eyes of observers for those more obscure signs which, in the mixed and milder cases, are all but invisible. He also hoped to discover clues as to the types of therapy that might prove of practical value His case summaries show that the staff spent over 800 hours with the children and their parents, grandparents, teachers When we add to this time the additional hours in staff conferences, and in the control studies carried out on comparable age groups of children of average mothers, we can see that weeks of expert effort were devoted to the study and treatment of each case. Few children have had the heavy artillery of social agencies directed toward them to a greater degree

The products of over-protection Half the children were less than 10 when they were first seen, the balance were between 11 and 16 years of age All but one of the children had experienced difficulty in making friends. Half of the group could be described as quarrelsome, boasting, demanding, bossy,

selfish These children, trained by extremely indulgent mothers, had been spoiled for any role except that of a demanding tyrant They had to be leaders, the center of attention, or they would not play They expected the other children to accede to their demands, just as their mothers had Naturally they were extremely unpopular The rest of the children studied were classed as timid and shy They thought other children (especially other boys) were too rough, and they chose to play with younger children or girls if they played with children at all One or two preferred to be with their mothers, and others would play with other children only when their mothers were present.

In verbal skills the group showed better-than-average performance, and the IQ's of 13 of the 20 children showed a "superior" or "very superior" rating. Only two could be described as dull. Their interests and hobbies included music, drawing, reading Only two showed any interest or skill in sports. In scholastic achievement they were above average in all fields but in mathematics. In that area there were special difficulties.

Perhaps the most glaring feature of all was their immaturity and dependence. We read of a 12-year-old who expects his mother to shine his shoes, butter his bread, take him to school, sleep with him. On the other side of the relationship we see mothers who cannot allow their children out of their sight, who follow them to the playground, take them to the store, meet them after school, visit their teachers, fight their battles, see that they go to the bathroom, and so on.

From earliest infancy there is a difference in the way these children were handled. Their mothers have devoted themselves to the children. They have not allowed them out of their sight nor entrusted them to the care of another person. The children were breast fed longer than children usually are. One fed her child exclusively by the bottle until the 42nd month "because he did not want to give it up." Virtually a voluntary prisoner of her child, such a mother sometimes comes to rebel at her confinement, for she discovers that she has relinquished all her social contacts, that she seldom leaves the house (and then always with her child), and that her child is beginning to develop demands upon her which she does not have the strength to fulfill.

Some of the mothers explain their monopoly of the child's social experience, and in doing so give voice to their own anxious and insecure outlook upon the world. They keep him from other adults (or children) because these other adults might prove to be sources of infection (colds, and the like). They limit his play with other children because the latter are too rough, too dirty, or because they use bad language and have filthy habits. They do not let him go to the store alone because he might get run over (or

kidnapped, or lost) Thus a child grows up in what must seem to him to be a terrifying world in which the BIG MOTHER is the sole agency that can protect him from a continuously threatening catastrophe. All but two of the mothers seemed to Levy to be actively preventing the social maturing of their children. And of the exceptions one was a case in which the child was so disobedient that the mother could not prevent his escape to his gang, the other was a youngster who was so very immature that he chose the very pattern she would have otherwise tried to prescribe (that is, he clung so closely to her that she did not seem to be "actively interfering with his socialization").

The infantilization of the overprotected child has two aspects. On the one hand, the child is deprived of all independent venturing abroad, of all the socializing influences of playmates. On the other hand, the child is robbed of the little autonomy he might gain in the home because of all that is done for him. His homework is supervised and he receives daily coaching. In Levy's cases there were few children who had any household duties and responsibilities. The children did not, as a matter of fact, take a normal amount of care of themselves.

The result of this type of childhood experience is an inevitable (and tragic) unpreparedness for later social experience, and for either the autonomy or the "give and take" which in our culture is expected of everyone. His needs, artificially fostered in the hot-house atmosphere of overprotection, call for someone to take over where mother has left off. His future wife is not to be envied, for her task—if his marriage is to be satisfying to him—has been shaped by this overprotective mother. In an adult competitive society there are few parasitic roles provided for such a person.

The products of two types of maternal control Nine of the mothers, in addition to their excessive maternal interest, were described by Levy as women of strong characters. Under their exclusive control the plastic child took on patterns of absolute obedience, subservience, docility. Punished as infants even now (a 13 year-old boy was sent to bed when he disobeyed) they never revolted. For the most part the children of these mothers were very considerate and could not tolerate the tensions generated by her disapproval. These were the sort of boys the other children called "sissy," "mamma's boy." These were the "good" children, polite, obedient, neat, respectful. Adults found them "nice", "mature", and their mothers found them most rewarding. Occasionally a mother would experience qualms. Her boy seemed "*too good*"; in training him she feared that she might have robbed him of the aggressiveness he would need in fighting his way through

an alien world. Levy does not report, however, that these latter mothers were able to change their own pattern.

Eleven of the mothers were indulgently protective, making excessive concessions to their sons* and behaving as though they were totally unable to assert their will against that of their child. The "infant monsters" developed by these indulgent mothers surpass belief. The average home is well-acquainted with infractions of rules, bits of impudence, and even more than occasional signs of a lack of respect for others; but few homes would tolerate the unrestrained patterns of these over-indulged sons. *Their* requirements, and not the family's, came first. They ate when they chose, and what they chose. They left the table when they were ready, went to bed when they chose, threw their garments about, told their mothers to "go to hell," told them to "shut up," tracked mud across their floors in spite of protests. They struck their mothers, spit at them, went into a rage at the slightest frustration. Observing some limited segment of their behavior we would conclude that they were emotionally unstable, that they had an unusually low frustration tolerance, that they were very weak in those forces that bind and confine the crude impulses of our nature. Four of them, seen later as adults in follow-up studies (at ages 23, 25, 25, 25) conformed to the pattern described (see page 167) as "psychopathic personality." They were still making exaggerated demands upon the world, interested only in satisfying immediate desires. In school and in vocation they had proved unstable, and they had not been able to profit by a succession of experiences that would have sobered other persons. Rich in maternal love (of a kind) these four boys had been poor in discipline, poor in training in socialization. Their impulses had never been bound. They had never learned self-discipline for the sake of the love of another. Their formula seemed to be, "She loves me, and I can do what I choose to her." They repaid indulgence with redoubled demands; their appetites and needs grew to abnormal proportions through being fed (and never denied). To their schoolmates and teachers they were pests, bullies, show-offs.

Not all of the eleven followed the pattern consistently to adulthood; in fact some of these domestic tyrants became such model pupils at school that their teachers could not believe that they had given so much trouble at home. The sharp contrast in their behavior in the two settings is a noteworthy instance which testifies to the plasticity of the human personality. Neither their schoolmates nor their teachers would tolerate their fighting, bullying, demanding, egocentric pattern; and the children were, in the majority of the cases, able to readjust their demands to conform to social

* Nineteen of Levy's cases were male, one female

reality. Tempered to this reality the tendency to show off became a milder clowning, their aggressiveness developed into a capacity for leadership, and their demanding ways developed into persuasive powers

If we consider these cases of overprotection in the light of the questions we have raised in connection with the study of emotions, we can draw important lessons. Any cross-section study of these children, such as would be made by an observer who saw them only at the hour of their physical examination, would certainly reveal that they are not like other children emotionally. They enter the examining room anxiously, reluctant to leave their mother's side, insisting that she be allowed to remain during the examination. One child gagged persistently. Several objected to undressing. One tried to prevent the physician from taking notes. They were so ambitious to make a record in some cases that they cheated on the tests. One child gabbled continuously, another showed fear and suspicion, another tried to take charge of the examination and ordered the physician about. An observer who did not know the background out of which these children came would be inclined to look upon these children as *organically* different. Their very reflexes are not the typical ones. Their needs and demands are not typical, or if they are qualitatively like those of ordinary children, they are at least hypertrophied to unusual proportions.

If to understand these emotions we have to see the child develop in the family setting, if we have to see the matrix to which his peculiarities are neat adaptations before we can understand their true meaning, then we shall be skeptical of the significance of any purely physiological concept of emotion. These emotions are symptoms of a kind of interpersonal adjustment, of a kind of lack of training in independent living. They arise because the world they have grown to demand is not congruent with the world to which they must adjust. Their emotions are rooted in their tragic unpreparedness, and in the artificial demands fostered by a love that was stronger than it was wise.

The Genesis of Apathy, Withdrawal, Emotional Unresponsiveness

A study of 50 children seen in Baltimore clinics gives us a clue to another dimension of emotional development.⁶ These children were unresponsive to their human environment, absorbed in repetitive play. Either mute or limited to less than normal language skills, some had been so retarded in communication as to lead to the suspicion of deafness. Even as early as the second half of the first year of their life they seemed to respond to people in an abnormal way; they did not assume an anticipatory posture when they were picked up nor adjust their posture to the one who held them. Their

speech, when it developed, was full of neologisms, irrelevant utterances, pronoun reversals. In their ascendants Kanner could find no psychoses or abnormalities sufficient to account for the children on a genetic basis. In fact the family histories read very much like those of Lewis Terman's gifted children. Their fathers were scientists, professors, artists, clergymen, business executives, and their mothers (with 5 exceptions) were college graduates and (with one exception) all had been vocationally active prior to marriage (scientists, laboratory technicians, nurses, physicians, librarians, artists).

Emotional refrigerators The homes of these children were characterized by parental coldness, an obsessive concern about routine and the mechanical attention to material needs, an earnestness in teaching perfect performance in skills. There was little warmth in personal relationships. Though some of the children could name the presidents and vice-presidents, repeat nursery rhymes, answer the questions in the Presbyterian catechism, and repeat names, dates, and other useless (for them) information, they did not show any interest in other children or use their speech in communication. The parents were described as "not comfortable in the company of people," as more interested in "reading, writing, painting, making music, or just 'thinking'." They described themselves (and their marriage partners) as undemonstrative. They had a keen sense of their duty, however, and were determined to bring up their children as though each was to be "a perfect experiment." They kept careful diaries of their children's behavior, they worked for obedience, control of elimination, and the earliest development of skill. One had purchased an encyclopedia for his two-year-old, one tried to teach his child to walk at three months. But as they entered the clinic, the children trailed forlornly behind them on the stairs. As the mother sat in response to the physician's invitation, the child sat or wandered about at a distance. Neither moved toward the other; or if the child was held it was supported in a stilted, artificial way.

Into these families, so cold, so perfectionist, in which duty rules, the helpless child has to make its way. The unrewarding contacts leave it equally cold, disinterested, without any appetite for human contact. Its needs for warm human relationships seem to have atrophied.

The Genesis of Love

The concept of love can be a trap for the unwary psychologist. Far from being a simple, clearly defined state of consciousness, it is a territory, an area in which the most complex welter of attitudes, feelings, and purposes

are combined. Ever-changing, with parts waxing and waning, it has provided the theme for all the arts and certainly one of the dominant—if not *the* dominant—interests of life in western civilization. In our culture love is not only a value, it is a highly romanticized value; idealized, hedged in by taboos, fraught with anxieties, it is more than a mere current that flows from some instinctual source in our being. It is “Castles in Spain,” it is electricity and fireworks, it is “the one thing necessary,” the theme of romantic novels, of adolescent preoccupation. It is divine, it is foolish. It is that which conquers all. And in its achievement the individual betrays his life style more completely, perhaps, than in the achievement of any other complex of needs.

A working definition Love, like beauty, is what everyone already knows it to be. The futility of attempting a precise verbal definition is that our words never convey precisely and completely all that we feel. And the futility lies, further, in the fact that *if* we have experienced it, the definition seems quite unnecessary; if we have *not*, then though our words are well chosen they fail to communicate, to evoke in others the precise and appropriate echoes of sympathy and understanding. Few, besides poets, even dare. Sullivan, in his discussion of the development of the self, describes love simply: “When the satisfaction or the security of another person becomes as significant to one as is one’s own satisfaction or security, then the state of love exists”⁷ Not until the preadolescent years (8 to 12), he believes, is the individual really ripe for such experiences of intimate understanding, mutual care and trust; but when it comes there is a burgeoning of the self. Tentative and fleeting thoughts, difficult to grasp and express, personal and private feelings can be shared and consensually validated; for here is one before whom the most intimate aspects of one’s life can be paraded in an atmosphere of trust. Here is the occasion for truly grasping and understanding another, here is the beginning of one’s human-ness. Empathy, sympathy, understanding, and a growth in the self, are here tied together.

In a competitive society in which there is a great deal of insecurity, in which the growth of one ego is so often at the expense of another, love and affection—with their bonds of complete trust and confidence—form an island, a refuge. Here the self and “the other” grow apace, the interests of the one become the interests of the other. In the boyhood chum, in the clique of boon companions, but finally more completely in the marriage tie, these needs are fulfilled. For most of us the deepest bonds of all are built around our patterns of sex-expression and involve a component of lust; but it would be a shallow analysis to equate the capacity to love with mere sexual potency. Nor is the preoccupation with romantic affairs sure evidence of

this capacity According to one biographer, Stendhal's many essays of love, his dozen or more mistresses, were but the outer garments of a self that was never able to give or inspire any deep and enduring affection⁸ Strange, indeed, that this specialist in the tender emotions was himself so incapacitated; or shall we say with those who stress "compensatory striving" (see page 173), inevitably so!

This capacity to love is also "conditioned," and implies a history and a role Far from being a simple matter of native endowment, the free gift of a generous Nature, it is among the most complex of all the outcomes of our growing up in a culture. Though we use the same name for the experience, its forms are legion, and they overflow the boundaries set up by Sullivan's definition In the psychopathic personality, what *he* calls love is merely exploitive. In fact, it is doubtful that his brief sexual encounters, his feeble essays at spiritual intimacy, deserve the name Not having a stable and well-organized set of interests, how could he give sober thoughts to the interests of another. If he possesses the emotion at all it would seem to be fixated upon his own unstable, mercurial self. In the insecure and dependent person, love is bound to become involved as an important branch of the security-system; and in the socially ambitious and acquisitive person its finer nuances are crushed by the egoistic motivations Consider the words of the young lady in Maugham's *Razor's Edge* as she counters the rash proposal of her young lover:

"You're so impractical You don't know what you're asking me to do. I'm young, I want to have fun I want to do all the things that people do I want to go to parties, I want to go to dances, I want to play golf and ride horseback. I want to wear nice clothes Can't you imagine what it means to a girl not to be as well dressed as the rest of her crowd? D'you know what it means, Larry, to buy your friends' old dresses when they're sick of them and being thankful when someone out of pity makes you a present of a new one? I couldn't even afford to go to a decent hairdresser to have my hair properly done. . . . And what d'you suppose I'd find to do with myself all day long while you were reading at the Library? Walk about the streets window-shopping or sit in the Luxembourg Gardens seeing that my children didn't get into mischief? We wouldn't have any friends."*

In a sense we must see the person-as-a-whole before we can know what his capacity for love will be Whereas we say, in romantic mood, love has

* W. Somerset Maugham, *The Razor's Edge* (Doubleday & Company, Inc., 1944), p. 76. Used by permission of Doubleday & Company, Inc., Mr W. Somerset Maugham, and Messrs. William Heinemann, Ltd.

the power to transform the self—and it certainly has—we also have to consider a causal relationship that acts in the reverse direction: the existing self has its own power to define and limit love. Love, in short, is not some pure and unalloyed force that exists within our instinctive endowment, a force that is the same for all men. It exists, always, as a quality of a very concrete self in the process of development.

We can say, perhaps, what it should not be—and we might suspect that Sullivan's definition, constructed with a view toward mental health, is influenced by a psychiatrist's concerns. It should not be the possessive kind of love—like that of the overprotective mother—which absorbs its object and, with little sensitivity or respect for the child's needs, attempts to rework the plastic infant into her own image, or into a mere expression and extension of her own self. It should not be the excessively dependent love that is mixed with anxiety, fearful lest the object will—even for a moment—turn its interests away. Nor should it be the love fantasied by the immature self, the "complete solution" to all of life's problems. Neither should it be a completely sacrificial love, demanding of us a self-less-ness, a total surrender to some alter ego. It should be, rather, a relationship that nourishes us as we give, enriches us as we spend, permitting ego and alter to grow in mutual harmony. Lacking the techniques for creating or discovering such islands in a competitive world, the ego may withdraw, moving away from people lest in their demands they further weaken his security-system, or he may go about continually in search of the blue flower of the perfect romance (as Stendhal apparently did, little realizing the parasitic nature of his own immature demands), or he may cynically reject the goal as a form of adolescent romanticism, seeking instead what he can get out of people and, in his tough young self, creating the very conditions that will finally validate his suspicious outlook.

A few of the roots of love examined From the beginning of extra-uterine life the sensual and affectional threads are interwoven. Out of the nursing experience, out of the nurturing care, out of protection, warmth, food, and the thousands of ministrations that gratify his needs comes an expansive reaching out to those who surround him, together with the power of responding sympathetically to their moods. And with this power there also develops the dread of their displeasure, the fear of disapproval.

Even as this broad highway of affection and sympathy is being laid down the scarlet thread of erotic or sensual emotions begins to weave its pattern. In the cuddling of the child, and even in his nursing, there are erotic elements. In his eliminative acts and in the nurse's cleansing of his

body there are stimulations of zones that give pleasureable sensations. Affection is erotized, and both affection and the quest for sexual pleasures meet frustrations. In his weaning, in his training to conform to adult eliminative habits, in his mother's anxious prohibition of his tentative exploration of genital (and anal) regions, both affection and erotic interests meet with frustrations. Mother's disgust and threats produce a tangled web of impulse in which the word "dirty!" (or nasty) helps to link sexual pleasure, the taboo on unrestricted eliminative impulses, the fear of loss of love. Nor is the child always helped when, later on, he asks his first questions about the birth of babies, or when he expresses his affection for the parent of the opposite sex, startling an adult (with a clearly established incest taboo) by the apparent existence of claims that transgress all bounds.

The child has to learn the inviolability of the privacy of others, the differences in the bodies of boys and girls, the difference between what adults say and what people do; and in post-adolescent years he has to establish the basis of physical intimacy with a heterosexual partner under conditions in which a biologically mature (but socially immature) organism is still closely hedged about with social taboos, parental injunctions. On this pathway the gang and the like-sexed clique make the most common bridge by way of which we cross over to an adult outlook; but it is a bridge on which folklore, misinformation, vulgarity, are mixed with an ultra-romantic, over-idealized, conception of life. The taboos of secrecy lend excitement and interest and make this post-adolescent society even more sex-ridden than the rising tides of estrogen and androgen would warrant.

Into the mixture of ignorance, repression, and general immaturity, the biological tides of life release the full force of endocrine maturity. The adolescent, sighing like a furnace, discovers one day that the totally uninteresting pug-nosed girl who lives down the street—the girl to whom he had never given more than a passing glance of indifference, the girl with whom no one but a "sissy" would be caught—has suddenly taken on a "halo effect." Stendhal's figure of speech is apt:

"In the salt mines of Salzburgh a bough stripped of its leaves by winter is thrown into the depths of the disused workings; two or three months later it is pulled out again, covered with brilliant crystals: even the tiniest twigs, no bigger than a tomtit's claw, are spangled with a vast number of shimmering, glittering diamonds, so that the original bough is no longer recognizable."*

* From *On Love*, by Stendhal, p. 6. Copyright 1947, Liveright Publishing Corp.

In this moment of crystallization, as Stendhal calls it, the ordinary pugnosed maiden is transformed into an idealized image of the ideal sweetheart. Something that has been forming since infancy is suddenly objectified, externalized; and the transformation can be as great an overstatement as the preadolescent's perceptions were understatements.

In any case a new center of interest has been formed. The egocentric preadolescent whose sentences always began with "I" now begins them with SHE. She loves me, she loves me not. It is as though a childhood scene had to be re-enacted, only now it is re-enacted with an idealized one, one who—in a sense—does not exist on sea or land, a wonderful Madonna-like creature. All the solutions previously made to a complex of affectional and sensual cravings in *two lives* now have to be worked out in a duet of discovery.

In this final resolution the variations are literally infinite. Perhaps a third of them are deeply satisfying, a third fairly so, a third so lacking that marriages entered into with every thought of permanence prove impossible. There are those who turn back to the immature homosexual relationship, experiencing the idealization and seeking erotic satisfaction with partners who are members of their own sex. There are those who never fuse the erotic thread with the affectional, idealizing their marriage partners and placing them upon a pedestal of purity and seeking erotic satisfaction with a less inhibiting partner. And there are those who pursue the blue flower of the perfect romance through one love affair after another, blaming the imperfect human nature of their partners, never realizing their own immaturity, or foolishly blaming a biological nature for the inhibitions in their love life. For most of us there remains an element of mystery, delicious, painful, sometimes frustrating, sometimes deeply satisfying, a mystery whose solution demands a depth of self-knowledge that few of us attain.

A summarizing word of caution. Our list of samples is far from complete. Apathy, insecurity, the exaggerated expectancies of the overindulged, love (even in its manifold varieties) do not exhaust the list of possible need-integrates with their attendant emotional experience and behavior. Disgust, jealousy, envy, hate, shame, guilt, and dozens of others could be catalogued, described. Nor do the accounts we have given indicate the richness and variety of possible causal factors. There are many pathways to the compound groupings of behavior we have named. Our sampling is intended to reinforce three emphases. (1) The patterns we commonly refer to as emotions have a developmental history that reaches back to earliest infancy. (2) No list of three, or a dozen, or even a hundred of

these compounds will do justice to the richness of our emotional life (3) The environment of significant persons who have nurtured us and shared our most intimate lives is of primary importance in evaluating and understanding the emotional make-up of the individual. Emotions cannot be understood as the automatic expression of simple biological units inherited along with such structures as sense-organs, viscera, bones and muscles. The integrations with which we are concerned involve the structures, to be sure, but their form and function emerge as a life unfolds. The patterns take shape in that dialectical interchange between a developing self and its milieu.

CONSCIOUS AND UNCONSCIOUS EMOTIONS

The notion of an unconscious *mental* process has made slow headway. It seemed to some to be a simple logical contradiction. If mental processes are to be defined—as they once were—as events of which we are conscious and about which we can make verbal reports, then an unconscious mental event is a simple contradiction in terms. By definition it cannot exist. Let the brain, or the organism-as-a-whole, carry on whatever processes go on outside of awareness; let us not dignify these physiological integrations, however, with the term mental. Otherwise clarity is lost and all distinctions obscured. The psychological realities, however, have an uncomfortable habit of refusing to conform to logical definitions; and the properties of these extra-conscious integrations indicated a complexity, an historical derivation, a purposiveness. In short they had all the qualities of a conscious response, save one. Their possessor was unaware of their presence, he could make no report upon them.

Patients behaved *as if* they were haunted by emotionally toned memories, although they could report none. They were keenly aware of their own disturbed state; the visceral and organic reverberations were identifiable and far too incapacitating to be overlooked. But the patients were not aware of the *origin and meaning* of their difficulties. They were unaware of the *relation* between the present disturbances and their general style of life, their needs and aims, their histories. They seemed, to the examining physician, to be striving to achieve certain goals, to undo certain mistakes in the past, to overcome anticipated dangers, yet the goals and memories and dangers did not function as a part of the awareness of the subject, *as far as could be determined from their verbal reports*. What seemed to the experienced clinician to be the probable reason for the patient's difficulties was ignored by the patient, and often vigorously denied. Indeed, patients some-

times denied that the visceral symptoms had any emotional quality whatsoever. It was simply their heart, or their stomach that they wished to have improved; as for themselves they were neither afraid nor desirous of having their personalities analyzed.

Illustrative Cases

A patient who was undergoing treatment for anxiety attacks (with palpitation and breathlessness) complained of persistent high blood pressure. At the age of 18 it had been 180/120, and it had remained within the range of 155/95 to 190/120 over a 14-year period. In the course of therapeutic interviews the pressure fell to 145/90 and thereafter declined to 125/85, where it remained for three years during which the case was followed.* No medication had been given, no change of habits undertaken. The physician who reported the case attributed the improvement to the therapeutic interviews that had led to the revival and assimilation of forgotten memories. Pursuing the free-association method of Freud, the physician had been able to elicit memories concerning an event which had occurred in the patient's 8th year.⁹ During the recall the patient seemed to be carried away by a violent rage, losing contact with his surroundings. Grasping an ash tray he made an attack upon the physician (though actually avoiding hitting him). There were references to a "G——— d——— buggy whip." When this "behavior storm" had ceased, the patient seemed at first to be completely unaware of what had transpired, but persistent probing brought out a train of memories which gave meaning to the performance. In the scene which had passed before his mind's eye, and in which he had imagined that he was participating, he had been teasing his sister, and had struck her. His mother had picked up a pony whip which had been near at hand and had threatened him. The boy had managed to wrest the whip from her grasp. He jumped upon the bed, threatening her. Then, losing his nerve, he meekly gave it up to her, and she, violently angry, promptly gave him a cutting blow with the whip. This entire episode had been lost to his ordinary waking recall. Yet, paradoxically, though forgotten—in this sense of the word—the memory was in some fashion revived when, in stress situations, the patient reacted as though he were an 8-year-old about to be horsewhipped. In this case the cardiovascular system (and the total neuromuscular apparatus)

* At the age of 18 a normal blood pressure would show a value of 110 instead of the value of 180 recorded. The values increase with age, men of 40-60 commonly showing values near 140 (L. E. Hill in *Encyclopedia Britannica*). As the blood pressures are commonly reported the first, and larger figure, refers to the systolic pressure, the second figure, to the diastolic pressure in the arterial system.

seemed to be remembering better than the conscious person. Although the events toward which these reactions seemed to be pointed could not be named or clearly imagined in ordinary recall, the *traces* of these events persisted, and appropriate behavior-patterns recurred when similar stresses or associated cues set them reverberating. The complete recall with imagery, naming, perception of similarities between the past and present, and the interpretation of the former as the cause of the latter, occurred only when special methods were used. The heart attacks which the patient repeatedly experienced under stress thus represent a *partial recall*.

A second example A case reported by Dr. Esther Richards from the Phipps Psychiatric Clinic illustrates the way in which a patient can fail to become aware of the causes of his difficulties, centering his anxiety upon the symptoms themselves.

In September, 1932, a worker at Bethlehem Steel began a series of treatments for gastrointestinal upset. His distress (belching, palpitation, labored breathing, and general anxiety) had sent him running to the clinic. Chemical therapy (belladonna, bromides) failed to offer relief.

Looking into the background Dr. Richards found the following facts. For 12 years (since his 20th year) the man had worked for his present employer. Three months prior to the attacks he had had to give up a small home because of wage cuts, and the broken-down shack in which the family now lived was an unhappy contrast to his own home on which he had been making payments over the past three years. A friend who had boarded with the family had lost his job. Out of loyalty the patient felt bound to keep him in the emergency. The patient had not complained about these things. "We all have our troubles and mine are no worse than anybody else's, I guess. If I were feeling well, I would not mind anything." In other words, he bore his difficulties cheerfully, *as a man should*, but although he could control his speech, his bearing, and his overt expression, his viscera were completely out of hand. A frank recognition of the emotional character of his reaction, and the acceptance of emotional expression as legitimate, was difficult for him. What ten million others were enduring without whining he must be able to endure also! His very manliness (his struggle to live up to the masculine ideal) made insight into the nature of his illness unwelcome.

A third instance There are occasions in the lives of most of us when our adaptive powers are strained by the call for rapid readjustment. going away to school, joining the army, attending summer camp, and the first

complete break from the supporting and protecting environment of the home. When the resources and skills (chiefly social) of the individual are undeveloped, a violent attack of homesickness may occur. In such cases the food is unappetizing, people are dull (or indifferent, harsh, cruel), the surroundings are uninviting, the work is uninteresting. Commonly the individual knows what is the matter, and he knows quite clearly what he wants to do! His family may have to use all their skill to prevent him from beating a hasty retreat to the parental nest. But there are also occasions when the individual does not recognize the true nature of what is occurring. The school is just not suited for him! He was not cut out for military service, etc., etc. A more complete inhibition of the awareness of the source of the difficulty is evidenced in a report of a variety of homesickness (*cryptic nostalgia*) described in the armed forces.¹⁰ In this type of reaction the recruit has no obvious emotional disturbance, no insight into his condition. Outwardly he is not displeased with his environment. He is merely apathetic, a little preoccupied, vague, absent-minded, slow to respond, difficult to reach. He may fail to carry out orders, to come up to the standards of inspection, or to pass his tests with the aptitude rating his school record would seem to warrant. Asked by the psychologist, "Are you homesick, son?" one such recruit promptly replied in the negative with what seemed a sincere and definite manner. Then to the question, "What's on your mind?" he replied, "I was wondering what mother was going to have for dinner tonight." A member of a family of seven, this 17-year-old recruit had never been away from home. His whole adjustment remained fixated there. Although he was a volunteer, although consciously he intended to do his patriotic duty, although he did not grouse about his lot, although he would not admit to himself that he wanted to get back where he could put his feet under the family table, *he behaved that way*. In this latter case there were no complaints from the patient whatsoever. He did not recognize that anything was wrong. There was no bodily tension in the foreground of awareness. Instead, there seemed to be a general inhibition, a general withdrawal from the environment. It was as though all of his interests had remained centered upon the home, and the physical circumstances that had now cut him off from these familiar and rewarding contacts (save for the trickle of correspondence) left him detached from his present world, daydreaming of home. Until he could be put on the path leading to need-satisfactions and "reinforcements" in his present surroundings, he would continue to be anchored in the home-town. New roots were required for the need-systems.

Displacement

Once we have become used to the fact that emotional tensions do not inevitably carry with them a clear understanding of their origin, we are prepared to understand the mechanism of displacement. Unattached emotional tensions, like the Biblical devil, walk about seeking whom they may devour. The tensions generated at the office and the factory may find expression in the home. The innocent bystander interferes in a brawl at his own peril; for he may receive the expressions of the hostility in both contending parties. The scapegoat is simply an obvious and usually defenseless repository for the hates and tensions of a group of people who can neither diagnose nor solve their own true predicaments. One difference between a demagogue and a statesman lies at this point. The former directs the tensions of the group against the scapegoat (while the looting of the treasury continues); the latter works to achieve a positive program founded upon a realistic appraisal of events. Often the latter is less popular; for his program will call for change, compromise, reformulation of goals, recognition of error, surrender of special privileges, and a degree of insight that can prove painful.

Malinowski's account of the Trobrianders (inhabitants of coral islands northeast of New Guinea) might serve as a symbol of man's lack of insight into the causes and nature of his tensions.¹¹ The Trobriander, like many primitives, seems confused about the role of the male in procreation. Children come, pigs are born; but what have these things to do with males, or with sexual intercourse? The cause is separated in time from the effect. In place of the matter-of-fact explanation that civilized man would give, the Trobriander has an elaborate pattern of animistic belief. He can tell you all about the way in which the soul enters and leaves the body; and whatever he believes to be an influence upon the soul is a serious matter of his concern. The Trobriander is also concerned about his pigs; and he goes to some expense and pains to import a domesticated variety that is far superior to the local brand of wild razor-back. However, because of his own theories of procreation (and his disbelief in the white man's) he allows the imported animals to mingle freely with the native stock, and the speedy deterioration of the strain ensues. As a matter of fact, all the males of the imported strain are regularly castrated in the interest of improving their flesh. And the fact that domesticated pigs have offspring is advanced as positive proof that the white man's theory is all wrong. It does not even enter his mind that the boar of the brush-pig may have been involved. In a somewhat analogous situation, one of the native informants offered a

bit of his own experience as further substantiation of the Trobriand procreation-theory. On return from an absence of more than a year he had found a newly-born infant in his home. How could the anthropologist say that the male sperm has anything to do with procreation? Such an argument was unanswerable!

What we need to grasp, in this connection, is the simple fact that the sequence of events making up our histories results in tensions and emotions; but it does not follow that we who experience these tensions know clearly their origin or sense the goals toward which they are headed. Nor does it follow that these residual tensions will be coupled with an awareness of the means required to reduce their intensity or to replace the unpleasantly toned ones with the more positive states of joy, fulfillment, release, realization.

Conversion

A second concept, frequently employed by clinicians, can be clarified by our examples. When, as his name for the disorder implies, the clinician views the symptoms of *conversion hysteria* (tics, contractures, chronic tensions, paralyses, and the like) as the product of a conversion of "psychic energy" into somatic complaints, we can see that he has created a pseudo-problem by separating mental events from physical ones. How can a purely mental energy (invested in unconscious memories) produce physical and chemical changes in our tissues? How, indeed?

If we politely decline to make his first assumptions the problem takes on a different form. If we insist that the events we have been calling emotions are processes that go on within a mind-body unity, a unity that—to be sure—we can view introspectively or objectively, as experiences, or as responses, we need not ask how one view of the event can be converted into another. We need merely ask why the recall is complete at one time (with awareness and verbalizations) and incomplete at another? Why are some aspects and relations prone to be rejected or neglected by the subject while others are accepted or emphasized?

Even more insistent than the clinical findings we have been examining, there are a group of experimental studies which call for a new formulation of the problem of emotional behavior. The world of objects around us (and our way of perceiving them), the physiological changes within us (and our awareness of them), and the words we use in communicating with others about these objects, states, and interpretations, have to be studied in situations where there is a measure of control of conditions along with some effort to quantify observations. Let us examine a sampling of these studies

EXPERIMENTAL STUDIES: THE SEARCH FOR AN INDICATOR OF EMOTION

Since emotional reactions can be present without their being sensed as such, and since the patient's verbal reports so often missed significant relationships, it was with a great deal of interest that psychologists followed the development of a line of investigation which at first promised a fool-proof tool for the exploration of this rather nebulous territory.

The Free-Association Experiment

If a subject is instructed to respond to a stimulus-word by speaking the first word that comes to his mind as promptly as possible, and if he is assured that *any* word whatever will do, the reaction is called "free." We can record the words, study their frequencies in a group of subjects, measure the lapse of time between the stimulus-word and the response with stop watch, and we can study the dispersion of these reaction times. It has been found that there are wide fluctuations in reaction time, that some of the words given by the subject seem to be determined more by the sound than by the meaning of the word (thus. hook-book, kiss-huss). Average times fall between 1 and 3 seconds.

If the subject, in contrast to this "free" procedure, is asked to confine his responses to a single category (such as, opposites, verbs, the class to which the stimulus word belongs, a member of the class named in the stimulus word) this reaction time *falls*, indicating that the more complete preparatory set has actually smoothed the way for the response.

The so-called "free" associations are not unlawful, wholly irregular. When 1000 subjects were individually tested with a list of 100 stimulus words their reactions were found centering around a few common responses, with a scattering of individual reactions. The word *lamp*, for example, called out 78 different word-responses which could be grouped in about 12 categories (lamp-parts, lamp-types, words associated with fire, words indicating contrast with light, and so on); 650 of the 1000 subjects responded with a single word, *light*. Oddly enough the emotionally toned words seemed to give a longer reaction time and a wider scatter of responses. *Anger*, for example, gave 280 different responses, while *trouble* ran a close second with 255.¹²

As the word-association studies continued a list of characteristics of reactions came to be known as *complex-indicators*, a complex being under-

stood as a constellation of emotionally toned reactions that may or may not be open to recall. These characteristics included:

1. Slow reaction time.
2. Overt expressions of emotion accompanying the verbal response (for example, flushing, coughing, placing the hand before the face).
3. Substituting a different reaction-word when the list is given a second time.
4. Responding to the sound rather than to the sense of the stimulus word.
5. Perseveration of a reaction tendency When reactions seem to be determined by a preceding stimulus word rather than by the present one, it is argued that the earlier stimulus must have struck deeply and that its effects are still continuing
6. Repetition of the stimulus word.
7. Bizarre, individual reactions in unusually great number
8. Misunderstanding of the stimulus word

Armed with these indicators many experimenters felt that they possessed a tool with which they could explore the mind of a subject. A criminal, suspected of complicity in a theft or murder, could be tested; if he possessed guilty knowledge the reactions should show it. A patient with concealed memories which he could not verbalize—like those we have described—could be given exploratory tests. A wide sampling of his reactions could be made in a short time, and the indicators would show where intensive study should be made. Like a geologist's samples they would show where mining or drilling would be profitable.

The Galvanic Skin Reflex

While these studies were proceeding, an independent line of research added another "complex indicator." E. K. Muller had published (1904) studies showing that when the human body is placed in circuit with a battery and a galvanometer, the galvanometer will register a deflection whenever the individual is stimulated. This change in rate of flow of current was called the "psychogalvanic reflex" and later renamed the *galvanic skin reflex* (GSR).*

When the GSR was recorded as subjects were given the word-association test, it was observed that "emotionally toned" words produced wider swings of the galvanometer.¹² Using a standard list of 100 words Smith reported results which are sampled in the following table.

* The immediate cause of lowering of resistance is an increase in sweat gland activity.

GSR's for 50 Adult Subjects

<i>Ten words giving largest GSR values</i>		<i>Ten words giving lowest GSR values</i>	
WORDS	NUMBER OF UNITS OF DEFLECTION	WORDS	NUMBER OF UNITS OF DEFLECTION
1. Kiss	73	91. Carrot	18
2 Love	59	92 Bury (berry)	18
3 Marry	58	93 Hunger	18
4. Divorce	51	94. White	18
5 Name	49	95. Glass	18
6. Woman	40	96 Give	17
7 Wound	38	97 Flower	16
8. Dance	37	98 Pond	15
9. Afraid	37	99. Pencil	15
10 Proud	37	100 Swim	14

Data from Whately Smith, *The Measurement of Emotion* (Harcourt, Brace & Company, Inc., 1922).

Two investigators repeated the test and obtained very nearly the same rank order of the stimulus words H E Jones and D Wechsler, "Galvanometric Techniques in Studies of Association," *American Journal of Psychology*, 40 (1928), pp 607-612

An Experimentally Induced Complex

In an attempt to test the validity of these complex indicators one group of experimenters established the complex by means of hypnotic techniques. The post-hypnotic amnesia that followed provided them with subjects who resembled the patients suffering from "memories" that could not be recalled. In this case the area to be sampled was known and the differences between significant and non-significant words were clearly measurable.

Under hypnosis, a young man was induced to accept the following sequence of events as a part of his personal experience:

"One night, while visiting some friends, he met a girl to whom he was much attracted. During the conversation, attention was called to her new brown silk dress and she explained that, although not able to afford it, she had bought the dress hoping to make a good appearance when applying for

employment. He gave her a cigarette and lighted one also. While smoking, he noticed the smell of burning cloth occasioned by contact of his cigarette with the girl's dress. Unobtrusively he withdrew his hand, noting with relief that the girl had not yet noticed the accident and that she held her own cigarette above the burned hole. The girl soon became aware of the damage. She attributed it, however, to a spark from her own cigarette. He tried to take the blame by assuming the responsibility for having given her the cigarette but the girl refused his apparent generosity. The next day, by which time he had summoned up enough courage to tell her the truth in order to save his self-respect, he found that she had left the city."*

The subject was wakened and showed no recall of the experience. Nevertheless his free associations had undergone a change. Words such as *girl*, *silk*, *brown*, *burn*, called up verbal responses that were directly connected with the experience, thus revealing the presence of new determining factors even though these factors existed outside of his system of waking memories. Some words touched off the complex because their own emotional tone was allied to that evoked by the experience (for instance, *distasteful*, *dishonorable*)

An additional complex-indicator was employed. When the word that touched off a complex was given, minimal movements (usually imperceptible to the eye) were recorded by means of a tambour technique. The subject's hand rested lightly upon a tambour connected to a recording kymograph. The least change in pressure of the hand upon the pneumatic system etched its effect upon the kymograph tracing.

Most revealing of all was the general behavior of the subject during the 24 hours following the hypnotic session. One subject

"... slept poorly, awakened with a headache which persisted until the removal of the complex in the afternoon, had no appetite, was resentful and antagonistic toward the hypnotist, and somewhat uncooperative towards additional hypnosis. He was unable to assign any reason for these manifestations. Throughout the day he gave away his cigarettes and apparently could not enjoy smoking. He rationalized this behavior by the statement that he 'guessed' he was giving up the habit."†

The experimental results for the entire group of twelve subjects suggest that caution must be used in employing and interpreting such complex-

* Paul E. Huston, David Shakow, and Milton H. Erickson, "A Study of Hypnotically Induced Complexes by Means of the Luria Technique," *Journal of General Psychology*, 11 (1934), p. 68. Used by permission.

† *Ibid.*, p. 70. Used by permission.

indicators. Three of the twelve gave no indication, in their post-hypnotic reactions, of the presence of a complex. Of the nine who showed the presence of the conflict, five showed its effects in the kymograph records of their minimal movements, six in their verbal responses. Thus no single complex-indicator proved infallible. The three who gave no evidence whatsoever of the presence of the complex are reported as resisting the suggestions of the experimenter, as not accepting the complex.

Conditioned Emotional Responses and Awareness

The fact of association is probably the oldest psychological datum. Plato, in the *Phaedo*, commented on the way in which an object will call to mind the image of its owner. Moods arise along with these images, and hostile, amorous, or anxious overtones of feeling arise, depending upon whether the owner was hated, loved, or feared. A bit of ribbon, a leaf pressed in a book, a fragment of melody, a folded garment, will set a tide of emotion welling within us. All fetishes are constructed of such conditioned emotions.

The Balinese mother wittingly makes use of this conditioning mechanism when she sends her child running to her side by the terrifying cry of "Aroh!" which she shouts whenever the child wanders too far, or seems about to get into mischief. Along with her cry she shouts any one of a half-dozen fear-symbols ("Fire!" "White man!" "Tiger!" "Snake!") She reminds us of a mother in our own culture who uses the threat of the policeman (or the bogeyman) to enforce obedience.¹³

Throughout our lives we are building such conditioned responses; and because our shared experiences have endowed the cues of our speech with common emotional overtones of feeling and impulsion, we are able to communicate our moods to one another. Indeed, we often produce in others more than we intend. Artist, demagogue, word-monger, propagandist, play upon our emotions. We can be stirred, terrified, *controlled* by these symbols. Though they move us to action we are not always able to give a coherent or rational explanation for our actions. Deeply stirred by an address, we are sometimes at a loss to point out precisely why. Descartes, the French philosopher, writing from his exile in Holland, thought that the Dutch must be impressed by the beards and the deep booming voices of their pastors. Not being properly conditioned by the constellation of stimuli (and their oft-recurring settings) Descartes sought in vain for the impressive factors in the logic of the speakers.

The influences that surround us in our childhood must build response tendencies of this sort, tendencies that make us reverberate emotionally long before our powers of analysis and discrimination can isolate the sig-

nificant relationships. One portion of our reactions is like that of the patients we have described, and like the post-hypnotic subjects. we display the emotional responses but their roots lie far back beyond recall in that limbo of earliest infancy

An Experimental Demonstration of the Role of Discriminating Awareness

Using a modification of the free-association technique, Haggard gave electric shocks to his subjects (18) each time the word *sword* appeared in his list of stimulus words ¹⁴ In all there were 42 words, 10 relating to war, 10 to peace, 5 buffer words following the shock-word (*sword*); and a single "warning" word (*sharp*) always preceded the critical word The *sharp—sword* sequence appeared five times in each series.

GSR's were recorded and were found to spread quickly to the word *sharp* as well as to the critical word The GSR's also spread to other words in the series In this connection Haggard found an interesting difference in his subjects. At the end of their training some of his subjects could tell him precisely the word on which the shock fell, and they also knew that the word *sharp* regularly preceded it Others did not discover these relationships In this latter group the GSR's spread throughout the word-series, and the magnitude of the average GSR was twice as great as that in the more perceptive group. When the shock was omitted entirely, and the list repeated, the more perceptive group quickly readjusted and their GSR's were extinguished The confused group showed greater after-effects of the training Precise perception of relations had reduced the tendency to fixation and false generalization.

Reviewing our clinical and experimental evidence we can now indicate more precise meanings for the concept "unconscious emotions "

1. Minimal responses of which the subject is unaware and unable to report upon (GSR's, minimal contractions in voluntary musculature, obscure preparations to react to a coming stimulus)
2. Tensions of which the subject is fully aware but which he does not consider emotional. (Gastrointestinal or circulatory symptoms which are accepted as purely physiological events) There is a lack of awareness of the relationship between these reactions and current problems as well as a lack of understanding of their origins in earlier experience
3. Tensions which are accepted as of psychological origin and emotional significance but which are not understood functionally. They may be displaced upon some other cause, or they may remain simply as responses of unknown origin.

Evaluation of the Experimental Tools

Below the surface layers of memory lie the strata of a more distant and inaccessible past; and at the lowest stratum are residues from infancy which we never succeed in recalling. When the psychologist-detective presents us with a test-symbol it may touch off a reaction established twenty years ago, the second symbol may stir another complex formed within the hour. One response may be emotional because of the particular person asking the question (for example, the experimenter may be a superior on the clinic staff) while the next question may touch off anxieties that are almost universal in a competitive culture. The pattern of organization of the need-system in a personality is very poorly revealed by such an experimental procedure.

It becomes obvious, finally, that it is a life history, a role within a family (or clique, or social group) a system of need-expressions, that must be examined by the psychologist. If the GSR and the word-association list can serve as a probe, as a beginning point, this technique might conceivably be of limited use. It could scarcely substitute for a full personality study.

Some clinicians have found that these devices are useful as a kind of "psychological third degree." They have been used in locating lost articles, detecting guilty knowledge of a crime, as lie detectors, and as therapeutic devices (which have a certain suggestion-value to the uninitiated). As third-degree devices (often known to the subject only through the Sunday Supplements) they have proved to be useful in bringing about confessions from lawbreakers. The person whose knowledge of psychology is limited, and who is impressed by the array of recording devices, may feel that concealment is no longer possible, that his "mind is being read." But the data can scarcely provide a *certain* ground for differentiating between guilt and guilty knowledge, between a criminal and his accomplice. The conservatism of the courts, which are slow in admitting this type of evidence, is probably wise. With care in the construction of reaction lists, it is possible to discriminate reasonably well (though not infallibly) between a guilty person and one who is simply frightened by the examination technique, for the latter's reactions are not any greater on the crucial cues. Respiratory ratios (inspiration/expiration), cardiovascular changes (pulse, blood pressure), GSR's, and reaction-time indices have proved most useful. Successful detection of complicity in crime has been claimed, by some enthusiasts, in more than 90 per cent of the cases. Classroom demonstrations of the detection of "artificial crimes" are often successful, but a sophisticated subject can sometimes embarrass the demonstrator if he uses his wits.

The experimental evidence indicates that the use of GSR's in locating complexes in patients would have to involve much caution. There are spontaneous GSR's which appear to have no known emotional basis. Slight movements, not associated with anything more profound than postural shifts to obviate fatigue, produce deflections. Physical and mental health in a subject is quite compatible with many large GSR's. The magnitude of the GSR varies with its position in a series, and with nearness to "loaded" words. And when the records are in, they require interpretation and a relating to a carefully constructed life history. One clinician has argued that they prove useful in those patients who have difficulty in accepting the idea that their illnesses are emotional in origin.¹⁵ An objective record showing how the nervous system and effectors react to the verbal cues may do more than extended discussion. This is somewhat comparable to the other "third-degree" uses of these tools.

EXPERIMENTAL STUDIES: PSYCHOSOMATIC RELATIONSHIPS

In the very title of his work *Expression of Emotions in Man and Animal* Darwin had implied a duality that was generally accepted by his contemporaries: there was the *essential* emotion, an internal mental event, and there was the *expression* of this mental event in movements, glandular secretions, and so forth. We do not need to make such an assumption any more than we need to begin the study of psychology by assuming that there are two quite distinct realities—a body, and a mind.

It was this assumption, however, that launched William James upon his study of emotions and gave rise to a host of problems which shaped the research of the next two or three generations. For having assumed duality we wish to know, immediately, what the true relation is between the two systems. Do the emotions *cause* the bodily reverberations? How? Can a purely physiological cause alter our mood? And can we, classifying our emotional experiences, find a corresponding set of sharply defined bodily patterns? A theory was needed.

The James-Lange Theory

Common sense had long assumed that the experience was a prior thing, the bodily response a consequence, an effect. William James, at Harvard, and a Danish physiologist, C. Lange, independently suggested that the order of events should be reversed. The outer event that sets us reverberating

emotionally acts upon our nervous system; this in turn distributes the impulses to muscles and glands; and *then*, when these disturbances are finally relayed back to the brain, there arises an *emotional consciousness*. In this theory the emotion proper was an awareness of something that had occurred earlier in the tissues.

This fitted in neatly with the Darwinian theory since these occurrences in the tissues were viewed as basically determined by structures slowly evolved in the struggle for survival. Biologically useful, they prepared the organism—when mature—for fighting, fleeing, mating, and the like. No previous training, no understanding of essential relationships, no consciousness of goal or purpose had to be there before, let us say, the young hen first looked upon her nest of eggs as a never-to-be-too-much-sat-upon object. The reactions are immediate; *then* the feeling of ruffled feathers, the warmth of the ventral surfaces, the relaxation of the ventral circulatory blood-vessels, could arise as these peripheral structures *reported* what was taking place. Like the moment of “crystallization” in which the pug-nosed maiden is transformed into an idealized creature (in the eyes of the adolescent next door) such reverberations *hit*. They catch us unaware, off-guard. We had no idea . . .

Attempts to Refute the James-Lange Theory

The theory was promptly challenged; but many of the data presented in refutation were poorly designed for the purpose. Consider, for example, an oft-quoted case of a woman who had been injured in a fall from a horse and who had lost a great proportion of her bodily sensations, owing to the interruption of pathways in the spinal cord at the level of the neck (third and fourth cervical vertebrae) ¹⁶ The neurologist who presented her case as disproof of James' theory, insisted that in spite of her loss of sensation she showed grief, joy, displeasure. But his report offers no evidence of any special effort to study her introspective reports, to ascertain whether she *felt* the same grief, and so on. Since the physician could not make such comparisons the issue, as far as this theory is concerned, remained in doubt.

A similar methodological difficulty is inherent in many of the animal experiments of Sherrington, Cannon, Bard, and others. By ingenious operative procedures these investigators eliminated segments of the responding structures, severing the nerve fibers that activated muscles and glands, cutting the sensory fibers that “reported” the changes in these peripheral structures to the brain. While they demonstrated that intact neural patterns (innervating tail-hairs, claws, salivary glands, pupils, and the like) were essential for the expressive movements, and while parts of the patterns could be blocked off

leaving the rest intact, they could know nothing of the animal's consciousness; and nothing they showed had any bearing on the point at issue, although for more than fifty years this type of evidence has been repeatedly cited as disproof of the theory.

In another type of case, in which nerve lesions had caused the loss of control of the expressive movements of laughing and crying, patients reported a gross lack of correspondence between their uncontrollable expressive movements and their actual mood. The release of these patterns simulated, to those around the patient, hilarity or depression; but though these particular bodily reverberations could be felt by the subject, they were not sufficient to induce a congruent mood. Actually gay, they wept uncontrollably; or laughing hilariously, they felt sad, embarrassed. And in the complete facial paralyses there is reported a full play of emotions behind the "dead pan" expression of the sagging facial muscles. Here we can say, at least, that the back-wash from these *parts* is an insufficient basis for an emotional consciousness. But there are always many other processes going on besides these segmental acts. The patient may be trying to carry on a conversation, and his frustration, irritation, and embarrassment will have *their* bodily components. James' theory could be right if it is the totality of bodily reverberation that is felt. What the evidence suggests is that the absence of a part does not alter the subject's *namings* of an emotional state. These cases, also, were not invited to report any changes in the *quality* of the compound experience.

More serious than the objections usually raised is the implication that runs through the discussion, that the conscious person is normally and primarily engaged in sensing what goes on in his tissues. We are not like trained introspectionists preoccupied with the process of self-observation at such moments. We are conscious of the barrier that we would surmount, of a desire to strike an opponent, of a former situation that is dynamically similar. It is in its failure to see the emotional experience in its setting, in its belief that the problem could be studied in an isolated physical organism, that the James theory seems most inadequate.

Finally, when Cannon and his pupils showed that widely differing emotions showed the same bodily responses, and argued therefrom that James' theory must be wrong, the logic proved of little persuasive power. When it is shown that in fear, as well as in anger, the sympathetic division of the autonomic system is active (with accelerated heart, elevated blood pressure, enlarged pupils, adrenal secretions) there is still the contrast between the postures and movements of crouching and flight and the opposites of aggressive attack, and all the anticipatory movements which—unseen, beneath the

surface—prepare the individual for these different courses of action

On a par with this last argument of Cannon are the findings of Landis, Brunswick, *et al*, reported above, which show that our *named* categories refer to vastly different response patterns, the classification presumably being made on the basis of similarity in the total situations rather than on the basis of identity of behavior-patterns. Are the emotions the same, if the behavior is demonstrably different? And who has compared and contrasted the experiences involved?

One point can be mentioned, although no experimental data are available. If James were right a time relationship must exist between a bodily reverberation and a conscious state called an emotional experience; the former should occur first, in time. Unfortunately we have never found a way of timing the moment of arrival of this state of consciousness. If we ask the subject to press a key the instant he feels the emotion, we shall find ourselves with a record of key-pressure-movements, not emotional consciousness. The problem seems insoluble.

EXPERIMENTAL STUDIES: NEUROPHYSIOLOGICAL PATTERNS

Although the experimental studies did not bring the issue raised by James to a successful solution, their investigations did lead to the discovery of important neuro-physiological patterns. In searching for the precise bodily reverberations that formed the basis for the sensory-backwash to the brain the investigators were led to look for the neural distribution-center that activated these patterns. Is there a center that regulates these matters; and does each characteristic emotion involve a particular locus, or group of cells in the nervous system?

The Concept of a "Center"

Physiologists speak of a "respiratory center," a rather sharply localized group of cells in the medulla oblongata (enlarged upper end of spinal cord), from which paths flow out to the muscles involved in breathing and into which sensory paths from these structures (and from the lungs) flow. If these cells or their outflow are destroyed the rhythmic movements of respiration cannot be made. They are the neurophysiological minimum required for a movement pattern. Yet breathing movements are subject to temperature changes, to the shock of surprise, to all the events happening in the rest of the organism, in the normal, intact animal. The center is itself subject to

retarding, accelerating, inhibiting influences from the neural structures above, and in turn the center passes on influences to other centers. A very democratic arrangement

Similarly there are centers for righting reflexes, for ocular movements, for swallowing, retching, and so on. A scratch-reflex and a pattern of alternate flexion and extension that resembles the swing of the limbs in walking can be evoked in the dog whose trunk and lower extremities and their spinal cord innervation are disconnected (by severing the cord) from the upper portion of the animal. Hair-erection, sexual reflexes, bladder-emptying, and other complex responses are regulated by such spinal centers. The stimuli, in such reflex responses, are local; nothing that happens in these limbs is "felt" by (or can influence) the rest of the dog (since all connecting paths are interrupted). It is true that the dog can "see" the movements, but they are like the movement of a strange, foreign, body and the animal cannot lift the hind limbs or move them in any way. By surgical section the lower parts of the body are made autonomous. They continue to act under local controls

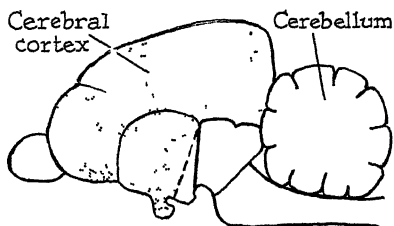


FIGURE 26. Section through a mammalian brain. The shaded area marks the part that can be removed without interfering with the animal's expressing rage.

High up in the hierarchy of centers there is a structure which—still subordinate to the cerebral cortex itself—is a kind of center of centers. If the highest levels of the brain are cut away, leaving only the thalamus (see Figure 26) and all that lies below it, a dog can be kept alive. And this "thalamic" dog can stand, blink when a hand is suddenly thrust before its eyes, snarl and bare its teeth in sham-rage, cower and whine as though frightened. It is an all-but-complete dog. But the deficits are noteworthy. It sees nothing at a distance, senses no shapes, swallows food that is brought to it but never sees or goes to get food at a distance. The operation has virtually disconnected the dog from its field, except in so far as loud sounds, flashing lights, strong pressures, pricks constitute a field. The field is a disorganized one in the sense that the thalamic dog never goes anywhere. The behavior-storms that resemble fear and rage soon subside. Without the constant care and intervention of the experimenter such a thalamic dog could not live.

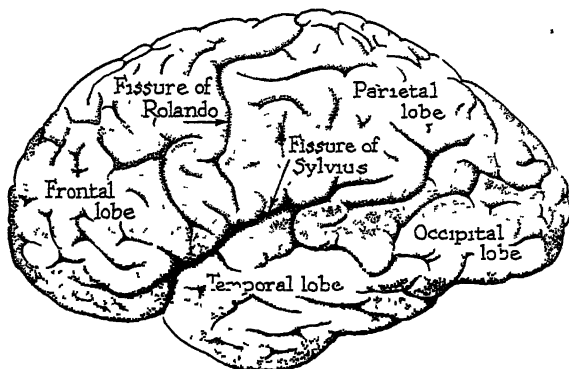


FIGURE 27. Outer surface of left cerebral hemisphere of the human brain, showing principal lobes and their boundary fissures. For another view of the brain, see Figure 18 [Based on E. Gardner, *Fundamentals of Neurology*, 2nd edition, W. B. Saunders Company, 1952.]

The Hypothalamus

We have arrived very close to the neighborhood of the centers for the patterns of expression of emotions. In fact, only the lower third of the thalamus, the hypothalamus, is needed. The “sham” emotions that remain are, in fact, more easily elicited, as though “released” from the higher controls. Normally subordinate to the cortex—the central switchboard through which pass stimuli from the entire field (intra- and extra-organic)—they now behave in autonomous fashion. Such operated animals showed a “sham rage” in response to pinching, pulling, or pressing the skin (or toes), a fly walking on the animal’s nose, being lifted from the cage to be fed, and the like. The reactions were blind, undirected, and left no prolonged after-effects. If the experimenter pinched the skin of the animal’s flank the head was turned—but only roughly toward the stimulus point, and the attack might spend its force against the animal’s own flank or hind quarters, ceasing abruptly with the cessation of the stimulus. Immediately thereafter the experimenter could place his finger against the animal’s mouth with safety.¹⁷ Yet we need not belittle these hypothalamic patterns.

Sham rage Sham rage is the most easily elicited of all these pseudo-emotions; the animals are “mad all over.” Hearts are accelerated, sugar content of the blood goes up, adrenalin is secreted, blood pressure rises, pupils are dilated, hair of the neck, back, tail is erected, teeth are bared,

snarling, growling, protrusion of claws and clawing movements appear. All these show the completeness with which the animal is placed on a war footing.

Other patterns One of Bard's cats showed fear (rather than the usual sham rage) crouching, mewling, retracting head and ears in response to the stimulus of escaping steam, and the animal ran in a slinking manner with its body close to the floor. The response can scarcely be called a "running away" or an "escape," since it was quite blind. The animal collided with objects in her path and behaved in the "blind" fashion of the decorticate animal. Other animals showed a combination of sexual, playful, and affectionate responses following stimulation of the genitalia when in heat.

One interesting observation indicates the degree to which we are dealing purely with physiological phenomena. Bard found that the irritability of his decorticated cats varied widely from time to time, and for the most part in an unpredictable manner. One correlation proved to operate in systematic fashion. He found that lowering the temperature of the laboratory *increased* the likelihood of the sham-rage reaction (as though the activation of the temperature regulation mechanism—involving activity of the sympathetic nervous system's centers in the hypothalamus—somehow "charged" this particular center and made it more susceptible to external stimuli). As we shall discover, the sympathetic nervous system is involved in both the sham rage and the temperature regulation. Two sorts of stimuli, each affecting the system in similar fashion, have a summative action when operating jointly. With a similar hypothalamic component, how different the two states in the normal individual: feeling cold, feeling angry.

Destruction of a portion of the hypothalamus In the endeavor to locate specific functional areas within the hypothalamus, Ingram, Barris, and Ransom used a cauterizing technique which burned out a sharply defined area. Placing two needle points (separated by 3 millimeters) in the various parts of the hypothalamus of intact animals, they produced a single lesion in each subject by passing 110 volt direct current across the points. The animals (macaques) were allowed to recover, the effect on behavior observed, the animal sacrificed, and cross sections of the hypothalamic area studied in order to determine the exact boundary of the destruction. They located a center, in this way, whose destruction left the animal somnolent, apathetic. Previously wild and excitable, quick to anger, the animal was now sluggish, comatose, apathetic, placid. For example, on taking a series of pictures with flashlight exposures, the flash would cause the animal to open its eyes

momentarily at each exposure; but the animal's position remained undisturbed, and it dropped back to sleep promptly after each exposure. These animals were easily handled, showed little irritability or fear. Faces took on an immobile, mask-like expression. No motor incoordination was observed; but although the animals could run and jump if sufficiently aroused, they spent most of their time lying on their sides, asleep. They lost appetite and occasionally one would fall asleep while eating, with his mouth full of food. The temperature regulating mechanism no longer operated and the animal had to be protected from heat loss. Because the animals were so drowsy, sleeping for long periods like a person with sleeping sickness, Ransom called the area which he had destroyed the "waking center." Without these cells, the animals lost the tensed, alert, and wakeful posture that we might call "vigilance," and with the disappearance of this posture of wakeful readiness external stimuli did not call out normal responses. Thus the "center" for anger and fear supports that normal attentive, state of vigilance; its functioning seems to tense up, charge, prepare the whole bodily structure for every kind of reaction.¹⁸

The lesions that produced this somnolent behavior were located in the posterior and lateral portions of the hypothalamus. When needles were inserted into this area in the normal animal and used as electrodes to stimulate the animal, the sham-rage previously reported by Bard appeared.

Stimulation of the "waking-fear-rage" center Masserman stimulated this hypothalamic center in unanesthetized intact cats by means of an electrode which had been previously implanted through the skull of the cat. The needle's tip lay in the hypothalamus, and its shaft, protruding above the skull, offered a more or less permanent "binding post" for electrical connections. A 2-4 volt 60-cycle current, passed through the electrode while the cat was moving freely about, or eating, produced a "behavior storm" that gradually mounted to a crescendo of violence. With retracted ears, crouching, tail-lashing, growling, erect hairs, rapid and deep respiration, widened eyes, dilated pupils, bared claws, biting, striking, clawing, the animal finally dashed blindly against the walls of the cage. But as in the decerebrate cats studied by Bard, the movements were spasmodic and undirected, explosive rather than adaptive; and the animal dashed against obstacles that it would have avoided under normal conditions. The "storm" had some of the characteristics of the forced contractions of muscles when locally stimulated to a reflex, involuntary contraction, by a faradic stimulus. As the stimulus ceased the storm abruptly stopped, if the animal had been eating previously, the eating was resumed. Even in the early phase of the

crescendo of forced movements the cat continued to lap its milk while its ears were being forced back

Unlike the hissing air-blast Masserman used in setting up his "experimental neurosis" these sham-reactions left little or no after-effect¹⁹

The Autonomic System

The stimulation of this limited group of hypothalamic cells could not produce such diffuse changes throughout the tissues of the body if it were not for an automatic relay-system. Figure 28, a schematic diagram, shows such a relay system spreading from a chain of cell clusters (ganglia) running parallel to the spinal cord. This latter structure, shown at the left of the figure, is the system of cells and their processes that relay impulses from the sensory surfaces up to the brain and from the higher levels down and out to the muscles. We have already referred to the effects of severing the cord. Some of the descending paths in the spinal cord have their origin in the hypothalamic nuclei we have been discussing, and the efferent fibers of these paths can be seen leaving the cord, at different levels, and joining one of the autonomic ganglia. These cell-clusters in turn pick up the impulses carried from cord to ganglion (by the pre-ganglionic fibers) and distribute them to the glands and smooth muscles of the body. Such smooth muscles are found in the iris of the eye, the walls of the blood vessels, the tubes and pouches that form the alimentary canal, bladder, and so on. There are minute smooth muscles in the skin, attached to the base of hair-shafts, the contraction of these muscles makes our hair stand on end in extreme fright (or cold).

There are three main divisions to this autonomic relay system: the central division (commonly called the sympathetic nervous system), a lower division (sacral), and an upper pair of outflowing paths jointly referred to as the cranial division. If we trace out the neural paths from cord to gland or smooth muscle we observe that many organs have a dual innervation. Thus the heart receives fibers from the cranial and the sympathetic divisions, the colon from the sympathetic and sacral divisions. This double innervation provides for excitation or inhibition of the organ, and the arrangement further suggests that the cranial and sacral divisions operate jointly in opposition to the sympathetic division. This functional dichotomy is borne out by the differential response of these two systems to drugs: the sympathetic is excited to action by adrenin, the parasympathetic (cranio-sacral) division by acetyl choline. To the chemical and anatomical facts we can now join the physiological and behavioral facts with which we have become familiar. The "sham rage" of Bard's decorticate cats is a response pattern mediated

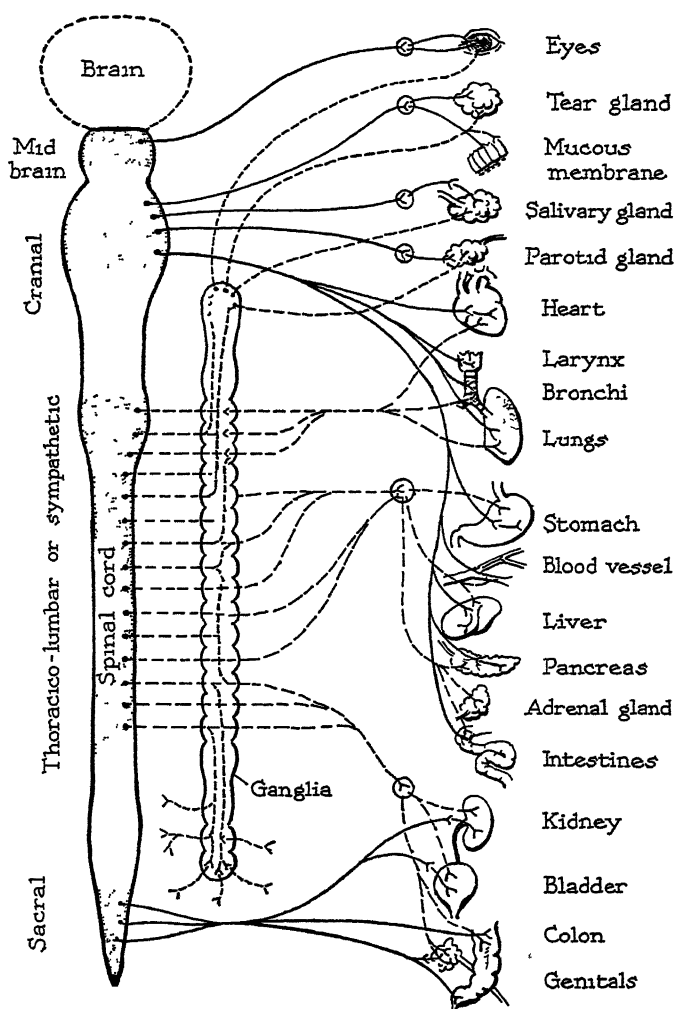


FIGURE 28 Schematic diagram of the autonomic nervous system. From the spinal cord (at left) two sets of fibers carry impulses to the organs the *sympathetic* fibers (dotted lines) which inhibit salivation, accelerate the heart, and so on, and the *parasympathetic* system (solid lines) which constricts the pupil, stimulates gastric activity, slows the heart, and so on. [Based on Cannon, *Bodily Changes in Pain, Hunger, Fear, and Rage* (D Appleton & Company, 1920), p. 25.]

by the sympathetic outflow. Patient experimental exploration has verified the fact that severing any one of the outgoing paths (between ganglion and muscle or gland) abolishes that part of the response. Without such interference the pattern tends to recur as a unit, and whether we use a painful

pinch as a stimulus for a decorticate cat, or a barking dog as a stimulus for a normal and intact animal strapped to an observation table, the autonomic nervous system tends to respond in the same fated manner.

It is to be noted that the action of the sympathetic division is sometimes excitatory, sometimes inhibitory—for example, it excites the heart and adrenals, inhibits salivary glands and intestinal movements. Yet the events do not occur at random. A functional unity and coordination are in evidence; and we get a new appreciation of Darwin's central idea as we realize the way in which the diverse changes, brought about by the sympathetic division, put the organism upon an emergency footing. When the sudden influx of stimuli arrives at the hypothalamus it is as though an alert had been sounded. The increase in respiratory rate results in a greater amount of available oxygen in the circulating blood. The excitation of the adrenal glands releases adrenalin; and this substance, in addition to accentuating the sympathetic action in general and duplicating most of its effects, causes the blood to coagulate more rapidly, causes release of glycogen in liver and muscle—thereby making important sources of energy available. The combination of more rapid heartbeat and the constriction of the smooth muscle walls of the blood vessels causes blood pressure to rise. The blood circulates more rapidly, bringing fresh energy sources to the contracting muscle cells and taking away (and neutralizing) the effects of fatigue. When the sympathetic division puts the organism on a "war-footing" the parasympathetic pattern is inhibited. There is now, physiologically speaking, "no time for love," no time for digestion or relaxation.

The James-Lange Theory Once More

The important role played by the adrenal glands in this sympathetic pattern, together with the availability of commercial preparations of adrenin, suggested another experimental test of the James-Lange theory. The experimenters reasoned that if injections of adrenin can duplicate the effects of stimulation of the sympathetic nervous system, and if the sympathetic division is the one that dominates the scene in the emergency emotions, then they could test the theory by producing these diffuse reactions in a human subject by chemical means (by injection of adrenin). For the most part the procedures failed to induce genuine *emotional* experiences.²⁰ The expected peripheral changes occurred, and a few of the subjects reported that they felt *as if* afraid. Like the muscular contractions forced by electrical stimulation of a motor point* the changes are sensed,

* A point on the skin surface above the place where a motor nerve enters a muscle. Electrical stimuli applied at such a point produce involuntary contractions.

but they are regarded as a foreign process. They do not put the total organism on a war footing, forcing all responses into line, nor do they produce an angry or fearful person. In a few subjects there was evidence of a more complete response. One reported: "I seem oppressed with a vague fear of something—feeling much the same as when I've lain awake all night frightened that Bill might die. In spite of knowing the cause of his illness the fear was not specific and neither is this. I am oppressed with a nameless fear."²¹

Here the state is no longer like a foreign object within the psyche. The adrenin has figuratively spread like a stain throughout the behavioral field, coloring the mood, and mobilizing thoughts which fit in with the mood. One subject appears to keep a firm grip on reality, is fully aware that an experiment is in progress, studies his heart reactions quite calmly and objectively, introspects in the Jamesian manner. The other behaves like a person with an anxious life style, or like one with a greater adrenin-susceptibility. Perhaps this latter person brings into the laboratory current personal problems and tensions which provide a facilitating soil for the chemical stimulus. Conditions as widely separated as hyperthyroidism, fatigue, ignorance of physiological facts, current business worries, exposure to cold, might alter the outcome. Anyone who has watched the widely varying reactions in a group of recruits taking injections (when their substance itself produces no immediate physiological effects) must realize as did Marañon, Cantril, and Hunt that a great many of the subject's responses are not simply the sensory results arising from the adrenin-effect, but depend rather, upon a larger psychological field. The findings indicate that a part-process (even as diffuse as the autonomic pattern) is quite different from the states of tension, anticipation, and release, which belong to genuine behavior cycles or which are expressions of an integrated life style.

Just how wary the experimenter has to be, and how many controls have to be employed, is shown by the reactions of a subject who has been given 1 cc. of .9 normal saline solution. His conversation with the physician runs as follows. (The figures in brackets give the time. The doctor's comments are in brackets.)

Doctor: Now I am going to give you the medicine [11.33]

Patient: Gosh, Doctor L., I believe you are giving me adrenalin. [11:34]

Doctor: Yes?

Patient: Golly, I feel a swooping feeling. I knew it. Isn't that funny? I can feel it coming out of my legs and just swooping up. I'll get the jitters right now. I'll bet I will. [11 37] Oh Lord! My heart begins to beat fast, see? It's not exactly like they come on but it makes a

start like they do It straightens right down here in my leg and makes me feel every minute like I was riding on a railroad train [11.38]

Doctor. [The pupils are rather dilated]

Patient: Doctor L , I know I don't need adrenalin I know I don't need that, that just gives me a nervous jitter. [11:39]

Doctor: [There is a slight amount of trembling] Well, how do you feel in in your body, now?

Patient: Nervous, slightly jittery. *I have got more adrenalin flowing from my glands than you could give me, I believe.* I think such a painful thing and. . . [11:40]*

A Concluding Statement

While the results of both animal and human studies point toward a rough differentiation of function within the hypothalamus, with the anterior portion controlling the parasympathetic outflow and the posterior and lateral portions controlling sympathetic responses, it must be remembered that these centers are closely bound together, that there is a constant interplay of effects between them, and that living situations have no respect for the physiologist's categories. These hypothalamic patterns are but the strings to the bodily instrument that is thrown into a melody of behavior by situations that endlessly combine and re-combine the segments They do not dictate the form of emotional behavior any more than the stepping reflex dictates the movements of the dance.

Even the physiological evidence is less clear than our first brief summary has indicated The emotional tension, irritation, resentment that Wolf and Wolff observed in their gastric ulcer case (with a fistula which permitted direct observation of the stomach wall) involved many signs of sympathetic activity, but the onset of resentment was marked by a *flushing* of the face (activated by *parasympathetic* outflow) an *increase* in gastric secretions and blood supply to the stomach, an *increase* in motility of *stomach* muscles. At the same time cardiac acceleration and other signs of angry resentment offered evidence of *sympathetic* involvement.²²

Mahl's dogs, put on a disturbing routine of irregularly spaced shocks and warning buzzers, showed this same combination of increased acidity (and gastric secretions), increased gastric emptying time, increased heart rate (again a mixture of sympathetic and parasympathetic elements).²³

Some asthma cases, in which emotional reactions are accompanied by an

* Erich Lindemann and Jacob Finesinger, "The Subjective Response of Psychoneurotic Patients to Adrenalin and Mecholyl," *Psychosomatic Medicine*, 2 (1940), p. 242. Italics added. Used by permission.

attack, illustrate the way in which the two segments of the autonomic nervous system are combined in mixed states²⁴ In one case the threat of separation from the mother precipitated a distressing attack of wheezing in a child In its setting the asthma appeared almost as a physiological symbol of crying Yet, physiologically, the gorging of the tissues in the breathing passages is due to a *parasympathetic* reaction; and the well-known efficacy of adrenin injections, which promptly alleviate the symptoms, illustrates the opposition between the two systems. Occasionally a sudden access of fear or excitement in a patient will abruptly terminate an attack In one instance a patient who was on the way to her physician's office became involved in an accident While she was carrying an injured child into a drug store she suddenly became aware of the fact that her attack had ceased. Her own sympathetic nervous system had supplied the "injection."²⁵

The states of pleasureable excitement (or "thrill") are also mixed states in which cranio-sacral and sympathetic components vie for control of the viscera Sexual behavior also involves joint excitation of the two divisions. Although the contrast between the after-dinner feeling of well-being and the state of anxiety tempts us to equate pleasure with the parasympathetic and un-pleasure with the sympathetic branch, the facts are obviously at variance with such a simple dichotomy

We return, therefore, to our conviction that emotions must be placed within a larger setting, within the behavior cycle, within a life style, in order to be understood If our studies have indicated anything it is that the parts, as parts, are not enough They do show us, however, that the mind-body problem, which intrigued James, is less of a mystery than formerly. We need not ask how emotions produce bodily changes: the changes are produced by stimuli just as any glandular or muscular contraction is caused. Contractions and glandular secretions can be caused by stimuli even when the center is cut off from the rest of the body As more and more of the response-systems are integrated into one response, the more they look like genuine emotional behavior But they do not divide at any point into emotional experiences and emotional expressions. There is a unity.

REFERENCES

- 1 W H R Rivers, *Instinct and the Unconscious* (Cambridge University Press, 1922).
- 2 Carney Landis, "Studies of Emotional Reactions: General Behavior and Facial Expression," *Journal of Comparative Psychology*, 4 (1924), pp. 447-501
- 3 Francis Thompson, *The Hound of Heaven*

4. O. L. Tinklepaugh and Carl G. Hartman, "Behavior and Maternal Care of the Newborn Monkey," *Journal of Genetic Psychology*, 40 (1932), pp. 257-285
5. David M. Levy, *Maternal Overprotection* (Columbia University Press, 1943).
6. Leo Kanner, "Problems of Nosology and Psychodynamics of Early Infantile Autism," *American Journal of Orthopsychiatry*, 19 (1949), pp. 416-426.
7. Harry Stack Sullivan, "Conceptions of Modern Psychiatry," *Psychiatry*, 3 (1940), pp. 1-117.
8. Mathew Josephson, *Stendhal* (Doubleday & Company, Inc., 1946).
9. L. B. Hill, "A Psychoanalytic Observation on Essential Hypertension," *Psychoanalytic Review*, 22 (1935), pp. 60-64
10. C. L. Wittson, H. I. Harris, and W. A. Hunt, "Cryptic Nostalgia," *War Medicine*, 3 (1943), pp. 57-59.
11. Bronislaw Malinowski, *The Father in Primitive Psychology* (W. W. Norton & Co., Inc., 1927).
12. A. J. Rosanoff, *Manual of Psychiatry*, 7th edition (John Wiley & Sons, Inc., 1938), pp. 884-957.
13. Gregory Bateson and Margaret Mead, *Balinese Character* Special Publications of the New York Academy of Sciences, Vol. II (1942), p. 31.
14. Ernest A. Haggard, "Experimental Studies in Affective Processes I. Some Effects of Cognitive Structure and Active Participation on Certain Autonomic Reactions during and Following Experimentally Induced Stress," *Journal of Experimental Psychology*, 33 (1943), pp. 257-284
15. Franklin Ebaugh, "Association-Motor Investigation in Clinical Psychiatry," *Journal of Mental Science*, 82 (1936), pp. 731-743.
16. C. L. Dana, "The Anatomic Seat of the Emotions," *Archives of Neurology and Psychiatry*, 6 (1921), pp. 634-639. A similar instance is reported by MacCurdy, but it suffers from the same shortcoming.
J. T. MacCurdy, *The Psychology of Emotion* (Harcourt, Brace & Co., Inc., 1925), p. 51.
17. Philip Bard, "Emotion I. The Neuro-Humoral Basis of Emotional Reactions," Chapter 6 in *Handbook of Experimental Psychology*, C. Murchison, editor (Clark University Press, 1934).
18. W. R. Ingram, R. W. Barris, and S. W. Ransom, "Catalepsy: An Experimental Study," *Archives of Neurology and Psychiatry*, 35 (1936), pp. 1175-1197.
19. Jules Masserman, *Behavior and Neurosis* (University of Chicago Press, 1943).
20. G. Marañon, "Contribution à l'Etude de l'Action Emotive de l'Adrenaline," *Revue Française d'Endocrinologie*, 2 (1924), pp. 301-325.
H. Cantril and W. A. Hunt, "Emotional Effects Produced by the Injection of Adrenalin," *American Journal of Psychology*, 44 (1932), pp. 300-307.
21. Cantril and Hunt, *op cit*
22. Stewart Wolf and Harold G. Wolff, *Human Gastric Function: An Experimental Study of a Man and His Stomach* (London: Oxford University Press, 1943).
23. George Mahl, "Chronic Fear and Gastric Secretion of HCL in Dogs," *Psychosomatic Medicine*, 11 (1949), pp. 30-44
24. Thomas M. French and Franz Alexander, "Psychogenic Factors in Bronchial Asthma," *Psychosomatic Medicine Monograph IV*, 1941, Parts I and II.
25. *Ibid.*, Part II, p. 23.

PART FOUR

The Modification of Behavior

CHAPTER 9. Learning: The Conditioned Response View

CHAPTER 10. Perceptive Learning

CHAPTER 9

Learning: The Conditioned Response View

Throughout the discussions in the preceding chapters there has been a recurring emphasis: every sample of behavior bears the imprint of an individual life history. The interactions between the organism and its environment affect the very tissues, and purposes, attitudes, and plans for the future emerge from these interchanges. Each of these “coming to terms” with the milieu leaves the organism changed. It becomes an organism with expectancies, an organism with memories.

In the following pages we shall endeavor to view the process at close range, seeking those principles and lawful regularities that will help us to organize the facts. Carefully controlled observations of learners, both animal and human, have poured from the research laboratories during the past half century; and they range from the physiologist's studies of conditioning to the studies of human reasoning. We shall seek those common principles that run through all of these experiences that change behavior; and we shall ask whether or not there is a single set of laws that will explain the whole range of phenomena, or whether we are confronted with significant differences in the learning of man and the lower animals, child and adult, novice and experienced reasoner.

Whether or not all learning is ultimately reducible to one set of principles, the samples of learning now coming from the laboratory show rather sharp differences in emphasis. Three major trends may be distinguished:

1. The studies of conditioned responses, stemming from the early studies of the Russian physiologists Bechterew and Pavlov, stress the temporal, spatial, and physical *properties of the stimuli* which force reactions from the learner
2. The studies of what has come to be called "trial and error" learning, of the blundering efforts of motivated learners to reduce their need-tensions, have stressed.
 - a. the *blind, non-rational character* of the readjustments,
 - b. the selective and controlling role of *tensions and releases*.
3. The studies of "insightful" or rational learning have stressed the perceptions of the learner, the *awareness of meaningful relations*.

It will be our task to survey the whole range of phenomena, to link the laboratory studies with the life situations with which we are more familiar, and to evaluate the analyses of learning behavior these three emphases have produced.

Before examining the detailed studies it may help us to pause for a brief overview, which will help us to see the learning process in its broader human setting.

AN OVERVIEW

Looked at over the long span of his history, man has been slowly learning to be human. He has learned how to get his food from the soil and the sea, how to conquer wild beasts, and how to combat invisible microorganisms; he has learned enough about the movements of the heavenly bodies to be able to plot his own course by their positions; he has learned to build machines, some of which weave a covering for his body, while others transport him through space with the speed of sound, he has discovered ways of recording his thoughts for future generations and of sending his voice around the globe. His mastery over nature is continually improving as he learns the laws of motion operating in the natural world about him, and as he uses this knowledge to meet his own needs.

And he has developed ways of living together, making codes of conduct and establishing a *discipline of training* so that as generation replaces generation the young may learn the ways of their elders, and through concerted and orderly action find both security and fulfillment in the place of loneliness, fear, and chaos. He has even turned his powers of observation and reflection upon his own nature, partly in the effort to clarify the essential

mystery of his own origin and destiny, partly in order that through his knowledge he might gain control over others, and partly in the hope of finding ways of improving his own nature (and the nature of those who come after him).

Learning as a Progressive Improvement in Adaptation

Thus viewed, his learning has been a steady process of improvement in his adjustment to the world about him. In the beginning he had little more than the needs that grew out of his own biological makeup; and these needs together with his reflexes made up his entire behavioral equipment. In fear and in ignorance he had to deal with the appetites and tensions that arose from within and from the world of stimulations assailing him from without. As time passed these urges, cravings, desires and fears—whose sum we call *will*—became structured into a collection of anticipations, of knowledge about what follows what, of skills in dealing with both his personal and impersonal environment. His institutions of government, the polite ways of his society, his technology, his systems of education, his habits, are growths which have taken shape as human needs struggled to come to terms with their matrix. From one point of view, an orderly world has forced man to become reasonable (or, as we say, “realistic”) to see and adjust to an order in things. From another point of view man has ordered the world around him, bending it to his will, arranging it in such a fashion that his needs are more completely satisfied.

Habits a conservative factor Human habits and human institutions are the outcome of the interplay between the motivated learner and his milieu. At any given stage of man's long march they are indeed, as William James once called them, “the enormous flywheels of society”, “precious conservative agents”. Looking at the growth of the child within a culture, the process of socialization consists in the child's learning the wisdom of the elders of the tribe. He learns how to eat and what to eat, he learns how to earn a living, he learns a role among his age peers and whom to greet with respect and whom to bully or snub, he learns the taboos (the “do not's” of the tribe) and comes to fear the disapproval of his fellow tribesmen. All that the tribe *values* is impressed upon him until, in becoming a good Zuñi, or Kwoma, or New Englander, these values of the tribe become a part of him, until they are embedded in his very nature. When he has become a well-socialized adult the mere impulse to act in a non-conforming way arouses a feeling of fear, of guilt, of shame, and his learned inhibitions (speaking as the voice of conscience) censure his very thoughts.

Such a bird's eye view of learning looks upon man's growth in knowledge as a process of acquiring expectations that fit the world of reality surrounding him. As generation has succeeded generation the approximation between expectations and reality has become, we believe, a closer one. *Now* we are reluctant to change them.

A Less Optimistic Evaluation of the Process

The course of human development is not wholly a smooth one, however; learning does not always produce improved adjustment or lead toward truth. As surely as modern chemistry is an advance over that taught in the 1800's, the schoolboys of that other era were required to learn many things that were not so. Even science has its blind alleys, and all who pursue them acquire "knowledge" and habits that serve (for a time, at least) as blinders to shut away the truth. Tribes and civilizations have a heyday of youth, a maturity, and a period of decay when through sheer force or superior wisdom other tribes with other knowledge and other values thrust them aside. Civilization itself seems to have had its blind alleys; and when the learner is surrounded by a decaying society, the more he learns the more his own decay is speeded. In fact it will be the "best people" (those who best typify the values of the tribe) who are most decadent. When the high priests of the Aztecs called for more and more human sacrifices to appease their angry gods, it was the most promising and handsome of the sons of the worshippers of Quetzalcoatl who were sacrificed. We can learn error as well as the truth, and tribal sanctions have been known to support decay as well as growth.

And in the growth of the individual there are numerous blind alleys and regressions, and finally a full stop, all short of our ideal of a straight line of unending growth. The child, having learned to nurse from the breast, refuses the bottle or introduces thumb-sucking as a universal comforter. Or, having achieved bladder control, he may regress to promiscuous wetting (as at the disruption in his schedule and status that comes with the birth of a sibling). Or a child may learn to stammer and find a defensive use for his defect in his everyday adjustments. Or the developing adolescent may grow increasingly shy and preoccupied, his bad social adjustment intensifying his will to avoid others and his isolation and preoccupation resulting in an ever-increasing gulf between him and his peers. And finally, as we age, possessing a bread-and-butter knowledge of the world sufficient to care for our more pressing needs, and with the biological fires of spring now banked and slowly smouldering, the edge of curiosity—like the edge of desire—is

dulled. The old dog learns few new tricks. In fact, that which disturbs the comfortable routine of habit arouses resentment, that which challenges the ritual-sanctioned belief is dismissed as incredible, or punished as heresy. The habits of a lifetime now emerge as conservatism (or old-fogeyism) and fight a rear-guard action against what is new. What is merely good has the power to defeat that which is better.

Man's Aspirations to a World View

One additional aspect of the learning process appears as we construct this over-all view. The skills, theories, and beliefs man has achieved have never been completely satisfactory. Even now the laws of science, like the laws of the state, require so many exceptions and qualifying hypotheses that few scientists feel content with their knowledge. There have always been gaps in man's knowledge: the world of the known, feebly illuminated by previously acquired expectancies, has always been surrounded by a *terra incognita* of ignorance, of guesswork, of mystery, of fable. With incomplete knowledge and pressing needs, man's restless imagination has always reached out into these dark spaces, endeavoring to fill the gaps and to stretch the mantle of his limited experience over the boundless unknown. Like the *nouveau riche* who hires a genealogist to construct a past worthy of his present exalted status, he set his medicine men and his best story-tellers to constructing tribal myths containing the story of his mysterious creation and his glorious destiny—myths which usually placed his own tribe close to the center of his universe, an object of prime concern to the beings or forces who first made the world. And the feebler the light of knowledge, and the more his thoughts were filled with concern about these shadow-shapes of his imagination, the less he sensed any contrast between sober matter-of-fact knowledge and his fancies. He was like the child whose glibly expressed imaginings make his parents fear that he will become an incorrigible liar. In his urge toward completion of his fragmentary experience, and in the midst of the uncertainties created by his scanty knowledge, he could not sense any great contrast in credibility between the parts of his experience. There was always the steady pressure of his unreleased tensions, his unfulfilled needs, to prompt imaginings and questionings; little wonder that the latter constantly overflowed the boundaries of the known. The patterns of anticipation set up by his daily experiences with the familiar and the near spread like an unchecked ripple to the farthest reaches of his imagination. Compounded out of the well-spring of his own nature and the pressure of his desires, and partly shaped by his limited experience, grandiose cosmologies and mythologies grew.

Constructed, as they were, out of his own needs and experiences, his gods were beings with desires very much like his own. His Valhalla looked like one of his own temples, slightly modernized and prettified, the unknown people whom he imagined beyond the sea or beyond the edge of the desert (or the other side of the moon) behaved very much as he did—although, sometimes, as in our own dreams, they acted out what in reality he could not do. This aspect of wish-fulfillment seems the more natural when we recall that the motivation for these constructions was provided by a very real and very large residue of unfulfilled needs. So the poor dream of riches, the scorned imagine power, and the hungry sit down to imaginary feasts.

Conformity of Behavior to Fanciful Cosmologies

Now it would be incorrect to set up a sharp boundary between two territories and say that one is the area of knowledge (the product of learning) in which man's verifiable and oft-repeated experiences gave him TRUTH, whereas beyond the barrier he toyed with an imaginary set of ideas, of FICTIONS, *which he recognized for what they were*. The 'boundary line' was not (and *is not now*) wholly clear, his sacrifices to Quetzalcoatl were as serious as his dropping of the corn in the soil; his propitiation of the rain god as necessary as our purchase of a winter's supply of coal, his loss of an amulet left him feeling as defenseless as a war-time housewife without her ration book. As far as his own awareness went, he lived in one world in which the tribal myths and the creatures of his imagination were fused with the patterns of expectation that had been verified and corrected by the daily round in his matter-of-fact world.

As for his behavior, that now appears to have occurred in two worlds. Somehow—and we need to discover how—the differences between these two worlds have finally forced upon man an awareness of his slender grasp of truth. We find it easy to believe that in the first place he acted in accordance with his world view. Did not our contemporaries, the Nazis, act in accordance with their view of the Aryans as a super-race destined for a thousand years of glory? Then we can forgive the villager in Chan Kom for his foolish attempts to purify the man infected with "evil winds." In short, man tends to *act* in accordance with that fusion of perceiving and imagining that experience creates; and even though his "private world" is incorrect, *in fact*, his behavior is more or less appropriate to it. If he and his fellow tribesmen believe that piercing, tying, burning the waxen image of his enemy will cause the latter to fall ill, then he will *do* this thing in order to injure the adversary whom he fears.

Failure of Experience to Correct False Views

But actions also occur in a real world, a world that is seldom perfectly mirrored in our thoughts and expectations. The best laid plans of mice and men meet with disaster, for they seldom embrace *all* of the relevant reality. And sometimes, apparently, they can be founded upon total misconceptions. And what happens when the plans go awry? Is the whole system of beliefs, the teachings of the fathers which everyone-who-is-anyone shares, suddenly thrust aside while a new construction of the events is immediately perceived? Certainly not always. On the contrary, the most common occurrence is a search for the thing left out of consideration in making our plans and forecasts, the invention of some auxiliary hypothesis to explain our failure, or a puzzled and hesitant repetition of the same act while the same underlying misconceptions, the original premises, are left undisturbed. In short, the action tends to continue—with minor variations—within the same perceptual framework, based upon the same body of tribal and personal experience.

Interaction of Myth and Reality

There is an inertia, a sub-rational quality, in our behavior, once learned. At times the auxiliary hypotheses proliferate until—with accumulating and inescapable evidence of their worthlessness—the whole structure of behavior and belief falls of its own weight, or is suddenly swept aside by a brilliant flash of insight, a new organization of experience which simplifies and illuminates—and *works!* In the latter case the brute logic of the matter-of-fact world (operating upon our wishful cravings) has beaten down the flimsy lace-work of our imaginings and qualifying hypotheses, but the joy we experience in our moment of insight reveals the release, in the new structure of perceiving, of these same cravings. The drama that we constantly witness in the study of man's learning is that provided by the interplay between myth and brute reality. In some cases the fixity and power of stereotypes and tribal sanctions seem to triumph—truth remains hidden over long periods. Problems remain insoluble because they are viewed through the perspective of falsely structured theory. Even in the relatively simple laboratory task the learner may fail to reason well simply because the task he assigns himself is not the one his materials (and his instructions) require. Thus the student of learning will be interested in the interplay between these two worlds, the role that wishes and preconceptions play in the progress of adjustment, and the kinds of blows that serve best to dislodge the structure of misconception which stands between the learner and reality.

Summary of the Overview of Learning

Looking back over our past we can describe our whole history as a learning process, as a gradual improvement in adjustment. Arising out of the interplay between the needs and cravings of inexperienced creatures and their material surroundings, new adjustments, new anticipations, new modes of conceiving arose again and again to provide a greater or more efficient fulfillment of man's needs. The view of reality we now possess is a closer approximation of the truth (we hope and believe). As an adjustment, learning seems to be tension-reducing, to lead to satisfaction, release, satiation. As a new mode of conceiving, the learned perception is a more correct view of reality, a more successful type of anticipating what is to come. But although the over-all picture trends in this direction, there are exceptions:

First: When the young learner is surrounded by older persons who live by a false world view, the learning process establishes error and leads to false adjustments. Among his cravings are interpersonal ones: he fears to be different, he respects and fears those who wield power, and particularly, if those whom he most deeply loves are the purveyors of false views and false standards, truer views will seem threatening, hateful, shameful. The total weight of these interpersonal forces is often greater than the individual's reason. He seems to require status, love, security, more than he does truth.

Second: There is an inertia factor in the habits we form. They seem to have the support of powerful forces which resist change. These "fixations" violate the conception of a constantly improving process, of needs creating better and better adjustments. Can we locate the conditions that give rise to these fixations?

Third: Man's contact with his surroundings is limited. His experience of the world is brief, local; his samplings of his milieu are made under the pressure of special cravings occurring at a given moment in his history. It is small wonder, then, that his views of reality are imperfect, that his ways of dealing with the world are faulty. And since new samples of reality continually confront him he is forced to "generalize," on the basis of his fragment of experience, to anticipate the implication of novel occurrences. This process of fitting together fragmentary experiences produces private philosophies, tribal myths; and these synthetic views, once created, act as regulators of behavior. Thus the "facts of life" are capable of miseducating us (if the samples we meet are not representative or if the projections into the future are too much warped by wishes); and as our private worlds grow and acquire power they become capable of concealing a better reality from our view.

Fourth: In view of the violence with which error has been defended, in the course of our human history, it would appear necessary to regard the structure of man's habits and beliefs as saturated with a force derived from his underlying needs, cravings, fears. The attempt to modify his views stirs his deepest resentment, even when the new views are truer. (The "light-bringer" is a threat to vested interests, maltreated by those whom he would enlighten) At any given stage in their development human beings have a limit to their tolerance for reality. Habits already established thwart the shift to newer adjustments. Our study of learning must, therefore, reveal the principles at work in fixations and maladjustments as well as in progressive improvement in useful adjustments. It must study the acquisition of bad habits as well as good, the construction of myths as well as of a science. And if we can locate the factors that lower our tolerance for reality, retard or reverse growth and improvement, then perhaps a psychology of learning can be used to make the human reality move closer to the optimistic view.

THE EXPERIMENTAL SETTING IN WHICH ANIMAL LEARNING IS STUDIED

All learning occurs within a matrix, or frame, which allows the learner a limited degree of freedom. Turning now to studies of animal learning, we find that in some experimental situations the freedom is extremely limited.

In the *conditioning harness* (Figure 29) the animal is held securely, so

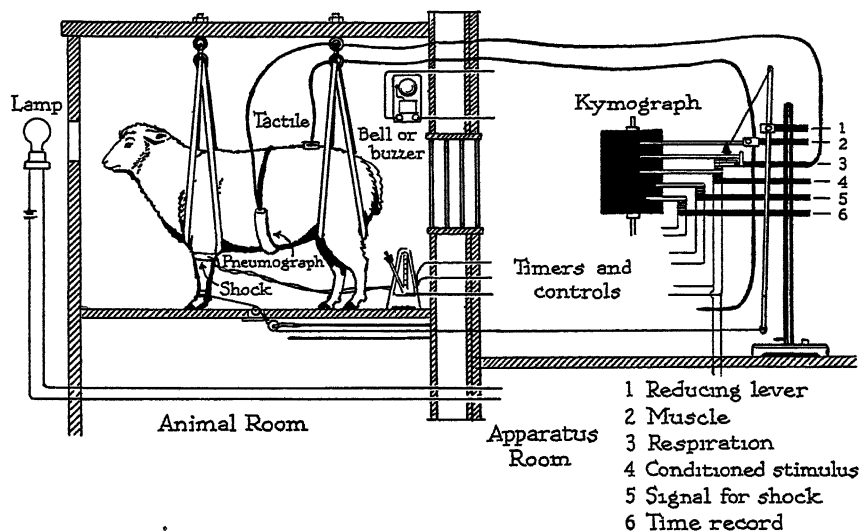


FIGURE 29. Liddell's apparatus for conditioning a sheep [Based on F. A. Moss (ed.), *Comparative Psychology* (Prentice-Hall, Inc., 1934), p. 261.]

that he cannot escape from the observation table, and so that his movements will not break the recording lines (thread from forelimb, rubber tubing from a pneumograph strapped around the thorax, and the like) When he is so confined, the animal can be subjected to stimulation (shock to foreleg, buzzer, metronome) in a controlled fashion The animal cannot avoid the stimuli The order of presentation, the intervals and intensities can be controlled In habituating an animal to such a harness there is commonly a period during which the attempt to fasten the harness induces violent struggle. If the animal is fed as soon as he becomes quiescent this struggle-response declines Soon the animal will lead the experimenter to the table, tugging on the leash, standing while the harness is adjusted The situational controls have now been supplemented by a kind of "self-control." Like an attentive pupil the animal holds a steady, alert posture, and it is upon this background that the new stimuli are superimposed. The study of his responses to the precisely controlled stimuli can now begin.

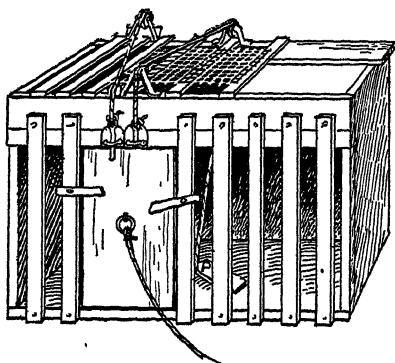


FIGURE 30 Thorndike's problem-box.

In the *problem-box* (Figure 30) a hungry animal is confined, with food in full view (but out of reach) outside He has more freedom than Liddell's sheep; but the freedom is still distinctly limited He is free to respond to any item in the situation, with any response, in any order He may thrust a paw between any two slats, pull on the cord, bite or gnaw the bars, howl, look toward the experimenter. Should he accidentally step upon the platform (P) a pulley system will release the catch holding the exit door and he will then be free to escape, to devour the food. Until he makes a reaction that will depress this platform, the hungry learner remains confined

In Figure 31 Hanford and Morgan's modification of the Skinner box is shown. Constructed for the white rat such a box (C) measures 10 x 12 x 20 inches, allowing freedom of movement within the ventilated chamber, but with solid black walls offering a minimum of cues The lever (L) projects from one wall, and just beneath it a food chute (T) empties into a

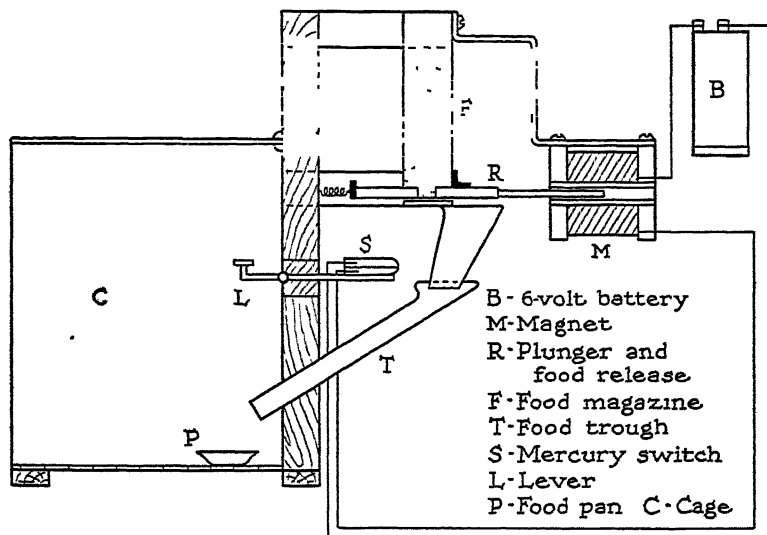


FIGURE 31 Diagram of a modified Skinner box used by Hanford and Morgan in studies of instrumental conditioning in rats. [From H. M. Hanford and C. T. Morgan, "A Simplified Lever-operated Feeding Device for Conditioning Studies in Rats," *Journal of General Psychology*, 21 (1939), p. 230.]

small pan (P). Outside the box, inaccessible and invisible to the animal, there is a food magazine with a magnetic release, and if the rat chances to rest his forepaw against the lever (L) a circuit to the electromagnet (M) is closed, operating the plunger (R) in such a way that a pellet of food is delivered. Again, however, the hungry animal is confined, and is given no food until he presses the lever.

In the *maze* (Figure 32) a fairly wide latitude of movement is possible. From a standard starting point the animal is free to enter blind alleys, to retrace his path. He may pause to wash his face, try his teeth on the covering netting, or go to sleep. However, he is under compulsion from his own hunger drive and if he is to secure food he must make a particular response—that is, enter the alleys leading to the food box. Thus the hungry animal is not free: the compulsion of his drive and the confining walls of the maze *force* him sooner or later to this one response. Some investigators prefer to simplify the problem for the animal by eliminating back-tracking; as soon as a section of the true path has been traversed a trap door closes it off. Others attempt to drive the animal away from blind-alley exploration by introducing electric shocks, administered as the rat crosses grids mounted in the floors of the blind alleys.

struggle-response which appears on the first trials is gradually replaced by a patient but alert state of watchful waiting as the training proceeds. If the food-taking responses are made central (by keeping the learner hungry and supplying him with food in the experimental setting) and if a metronome is started at 60 beats per minute and allowed to run for 10 seconds before the food is given, the daily repetition of the metronome-food sequence will introduce further changes in the animal's behavior. The animal "gets ready" to eat as soon as the metronome starts. The sound, we say, has acquired a "sign-character." The animal's behavior now anticipates the food-to-come. If the amount of salivary secretion is measured by a device which gathers the fluid from an opening made into the gland duct it can be shown that the metronome alone now causes a sharp rise in the outpouring of the gland. The entire organism has been "alerted" for food. With proper instruments the physiologist can record changes in the tonus and motility of the stomach and intestinal walls; and, if he could peer within (as has been possible in cases of gastric fistula) he would see a "blushing" of the stomach wall and an accompanying change in the amount and character of the gastric secretion poured forth by the stomach glands. Heart rate and blood pressure, respiration, posture, adjustment of the sense organs, all portray this set-for-food-to-come.

A Stimulus-Response Formulation of the Problem

A stimulus-response psychology, building up its conception of behavior upon the reflex principle, describes the changes in behavior as due to the formation of new "connections" between the metronome stimulus and the salivating, food-anticipating responses. A "connection" implies a neural connection, similar to the ones that bring about all reflex reactions. These new connections are commonly thought of as involving neural circuits that pass through the upper levels of the brain; and the loss of such habits through damage to these higher levels is counted as evidence of such involvement. We could, therefore, speak of two types of connections: the reflex connections that exist prior to training and those that arise from conditioning procedures. The latter we can call conditioned connections. To illustrate: the receptors in the skin which are stimulated by a painful shock to the foreleg of the sheep are connected by inherited (reflex) pathways with a foot-withdrawing flexion response. A set of nerve fibers passes from the skin surface of the foreleg to the spinal cord and back to the flexor muscles of the same leg. This pathway exists at birth and is ready to function as soon as the limb and its neuromuscular connections have grown to maturity. Similarly, there are reflex responses to sudden sounds, to chemical stimuli affect-

ing the taste buds in the mouth, to light, to pressures on the skin surface. With these ready-made reflexes even the inexperienced neonate is ready to respond to the first sequences of stimuli. The metronome will set off ear and neck reflexes as it reverberates through the auditory mechanism and finds a motor outlet. A light flash will set up changes in the retina of the eye, initiate optical impulses which will travel through the visual circuits, and will result in a slight eyelid reflex as the wave of excitation is reflected back to the eye musculature. The chemical stimulus supplied by the food, carried by the saliva to the taste buds of the tongue and oral cavity, will initiate salivary gland reflexes. These reflex reactions are "unconditioned"—that is, unlearned—-independent of any prior set of conditioning experiences. And they are not integrated into combinations or sequences. The eye-wink reflex occurs when the light flashes, the leg is lifted as soon as the shock is applied. In short, at the beginning the patterns of action are externally regulated and discrete. the responses follow the stimulus order of the moment. If the sequences of stimuli were constantly varied, so that, for example, light, shock, food, pressure, sound, were repeated in arbitrary and ever-changing sequences, the disordered and disconnected character of the reactions would persist.

In a stable matrix such as the experimenter sets up in conditioning the sheep, stimulus-response connections are activated in regular sequences. In Liddell's experiment, for example, a "connection" between the sound of the metronome and foreleg flexion can be established by a training procedure in which the sound of the metronome is regularly followed (for example, after it has sounded for 3 seconds) by the shock to the foreleg. Let us consider, first, the stimulus-response (S-R) connection, shock-foreleg flexion. This is an inherited reflex, present in any sheep, depending upon the maturation of reflex connection. It is called an *unconditioned response* (UCR). The goad, or stimulus, for such a reaction is called the *unconditioned stimulus* (UCS). The training in which the metronome becomes a *conditioned stimulus* (CS) capable of invoking the flexion is called a *conditioning* procedure; and the new act (foreleg-flexion in response to the metronome) is called the *conditioned response* (CR). One additional response, the original reaction (unconditioned) to the metronome stimulus (CS) is called the *unconditioned response to the conditioned stimulus* (UCR-CS). Figure 33 presents these connections diagrammatically. If this drawing is read from left to right the stimuli will be seen entering at the left and passing through the animal's nervous system out to the musculature, the priority of the metronome (CS) being indicated by its placement to the left of the shock (UCS). The metronome and shock stimuli are picked up by receptors which

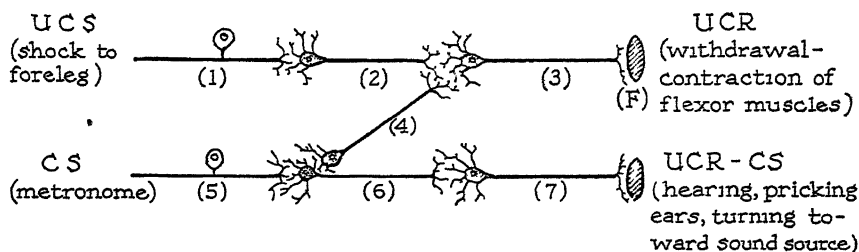


FIGURE 33. Schematic diagram of stimuli, neural paths, and effectors involved in simple conditioning. (1) Sensory nerve joining foreleg skin surface to spinal cord (2) Central neuron joining (1) to (3). (3) Efferent nerve fiber joining (2) to flexor muscle (F) of foreleg (4) Central connecting fiber joining (5) to (3) (5) Sensory nerve (auditory) leading into central nervous system. (6) Central neuron joining (5) and (7). (7) Efferent motor nerve (to ear-elevating muscles).

activate sensory fibers (1 and 5) and these in turn invoke central neurons (2 and 6). Each stimulus is relayed finally to an appropriate effector group, the shock arouses flexors in the leg, the metronome arouses the muscles of the ears, neck, and trunk which bring about a turning-toward-the-sound. The lines along which these impulses spread are predetermined; they are there when the experiment starts. If, as in the present case, we start with the animal's reflexes, the actions occur because the previous growth of sensory, neural and muscular structures has provided the action-systems. They are integrations of the parts of the organism mediated by these thread-like paths of nervous tissue which have grown into their positions with the maturing of the organism.

THE CONDITIONED RESPONSE

When the CS-US sequence has been given a few times the behavior undergoes a change. Instead of being delayed up to the instant of the application of the shock to the foreleg, the flexion reaction moves forward in time and appears in response to the CS (see Figures 34, 35, and 36). Figure 34 shows a record taken at the first presentation. Note the record of the gasp and the foreleg movement in the lines labelled "respiration" and "left foreleg." The responses occur *after* the shock. The metronome does not induce any changes in either the respiration or foreleg lines. In Figure 35 the changes appearing in the sixth trial are shown; the respiration line shows disturbances that set in promptly after the metronome is started. Close inspection shows a minute twitch in the left foreleg. By the eleventh trial marked

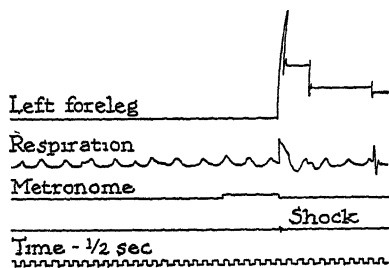


FIGURE 34 Record made in a conditioning experiment. This figure shows the first pairing of metronome and shock.

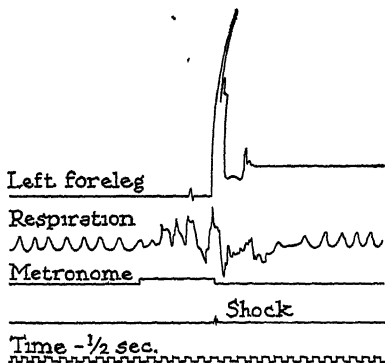


FIGURE 35. The sixth paired presentation of metronome and shock. Note the anticipatory reactions shown in the Respiration curve.

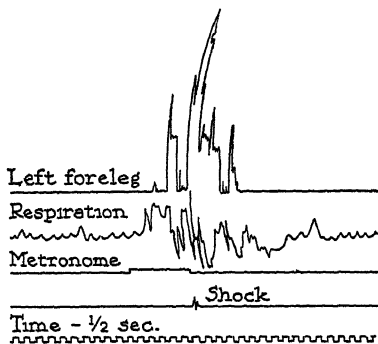


FIGURE 36. The eleventh paired presentation. Note that the metronome now induces a movement in the left foreleg. [From F. A. Moss, *Comparative Psychology* (Prentice-Hall, Inc., 1934), pp. 266-268.]

foreleg contractions have appeared, and the breathing line is quite disturbed *before* the shock has appeared.

Similar records are obtained when the eyelid closure reflex is conditioned in a human subject. A puff of air directed against the cornea will produce an abrupt closure of the lid. If this puff is regularly preceded by the flash of a warning light (preceded by at least .25 seconds) the latency of the reflex closure declines until the closure actually precedes the puff. Figure 37 shows the tambour system attached to the head of the subject. The rapid movements of the lid activate the lever of a small recording tambour, sending a

FIGURE 37. Headgear used in studies of eyelid conditioning. In this case a shock on the cheek is used instead of a puff of air. Headphones deliver the warning stimulus. Note recording tambour connected to eyelid by a small arm [Oberlin Psychological Laboratory.]



pressure wave down a rubber tubing. A recording device gives a continuous record of the movements of the lid, the onset of the puff, the onset of warning stimulus, time-line, and so on ¹

In the illustration of the conditioning of foreleg flexion the auditory impulses, set in motion by the metronome, now spread into the foreleg-flexor-muscles—a wholly unusual path for these impulses to take—and pathway 4 in our diagram (Figure 33) indicates the hypothetical neural link required to bring this about. A less schematic diagram would have to show pathway 5 ascending to the auditory cortex of the temporal lobe of the brain, breaking through to the motor area in front of the fissure of Rolando, activating motor cells in the lower portion of this motor area which descend to the spinal cord at the level of the forelimb, and thence proceeding out to the muscles (Compare Figure 38, page 274.)

Possible Combinations

This method of producing new integrations between reflexes can be repeated with an almost infinitely varied set of pairs of reactions. The metronome can be converted into a signal for salivation, nausea, GSR's,* respiratory gasps, rapid acceleration of the heartbeat, provided appropriate UCS's are paired with it. Instead of the metronome, a flashing light, a touch on the hind quarters, a puff of air on the nose, or any other sensory cue could be made to initiate the flexor contraction. If the intensity of the shock is suffi-

* Galvanic skin reflexes (see p 234).

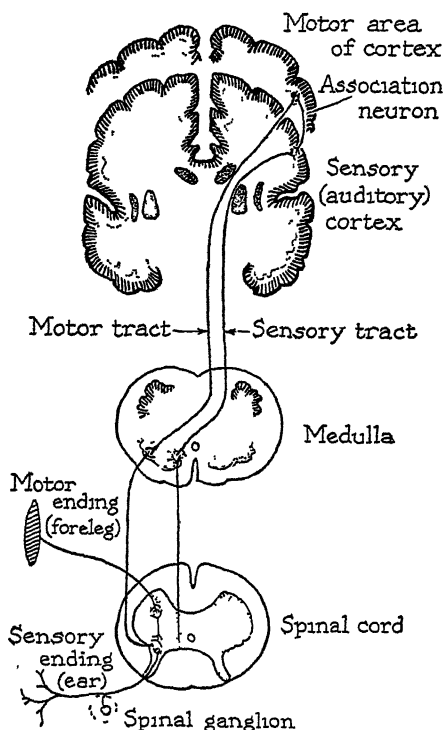


FIGURE 38 Simplified diagram of the connections involved in conditioning foreleg flexion [From H. Pieron, *Thought and the Brain* (Harcourt, Brace & Company, Inc., 1927), p. 6.]

ciently reduced it can be made to arouse salivation (by using the light shock as a warning cue just before food is presented), and with a gradually increasing intensity of the shock the animal can be trained to hold the foreleg posture while receiving a rather strong shock—one that would normally inhibit salivation and induce withdrawal reflexes. Thus the original reflexes can be inhibited and reversed, at least up to a limit. The perch can be trained to inhibit its tendency to strike at a minnow (by conditioning it in an aquarium with an intervening glass-plate), and the boy can be conditioned to like a cold shower. Reversals in tastes are common: the experience of the young smoker who acquires an appetite for an originally nauseating stimulus is but one of innumerable examples. Thus the facts seem to indicate that the central nervous system offers an infinitely varied set of potential links. Any sensory cue can be linked with any possible reaction. The facts would seem to indicate, too, that the nervous system itself does not decide these matters. In the illustrations we have selected, the connections that are formed all depend upon events at the periphery, upon the timing and relative intensity of the stimuli. The nervous system merely reverberates in response to what is put in at the sensory surfaces.

Increase in Strength of a Connection

The new CR may appear after a single paired presentation of CS-UCS; but in this case it is usually both sluggish and weak. Repeating the CS-UCS sequence at intervals strengthens the connection. The CR appears more regularly, the latency (interval between CS and CR) declines, and the force and vigor of the contraction (or glandular reaction) increases. A study by Anrep demonstrated an increase in the strength of a salivary reflex conditioned to the sound of a tuning fork.² A tone of 637.5 vibrations was sounded for five seconds. Three seconds after the sound had ceased powdered biscuit was given to the animal. Saliva was drawn off through a tube connecting with an opening into the duct of the salivary gland. Ten paired presentations were given every third day. The figures in the table below show the drop in latency as the conditioning proceeded.

Data from Anrep's Study Showing Relationships between Strength of CR, Latency, and the Number of Repetitions of CS-UCS.

NUMBER OF REPETITIONS OF CS-UCS	STRENGTH OF THE CR (MEASURED IN DROPS OF SALIVA)	LATENT PERIOD (TIME ELAPSING BETWEEN CS AND BEGINNING OF CR, IN SECONDS)
1	0	-
10	6	18
20	20	8
30	60	2
40	62	1
50	59	2

Figure 39 shows the increase in the frequency of the conditioned eyelid reactions of nine human subjects, recorded by the method previously described (page 272), when the UCS is an electric shock delivered to the cheek following a complex CS (consisting of tactual, auditory, and light cues).³

Effect of Nature of the Reinforcement on the Form of the CR

Another graph, Figure 40, illustrates the growth of a CR with repetition and emphasizes another function of the reinforcing stimulus (UCS). In this experiment eight guinea pigs were trained in a rotator (a modified activity cage) so constructed that the animals could turn their cage by their move-

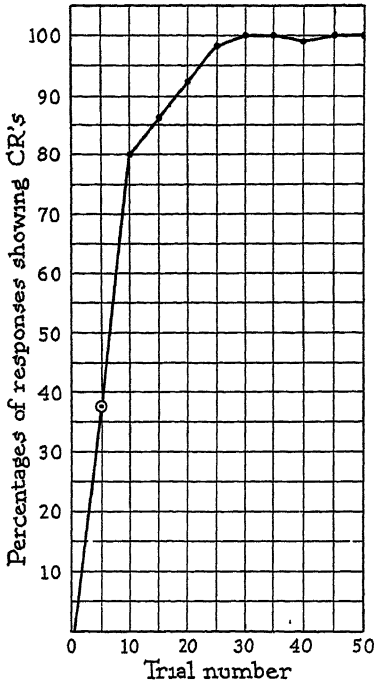
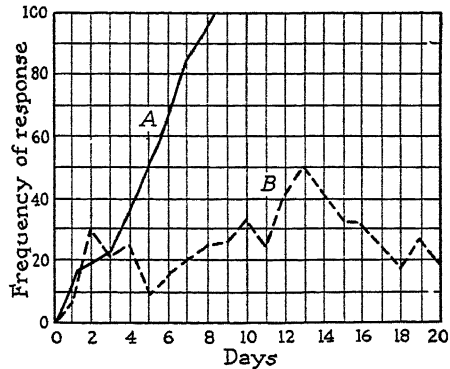


FIGURE 39. Frequency of appearance of conditioned eye-winks at successive stages of training. [From Miller and Cole, p. 417⁸]

ments ⁴ A tone (1000 vibrations per second) was used as the CS, when it had sounded for 2 seconds a high voltage shock was administered. If the animal's movements within this 2 second interval moved the rotating cage an inch or more the circuit was broken and the *animal received no shock*. Any failure to move was punished. The rapidly ascending curve (A) in Figure 40 shows that the guinea pigs learned to rotate the cage promptly when the warning tone was sounded. The typical animal reached perfect scores on the eighth day. There was considerable variability in rates, the slowest animal requiring 13 days, the fastest but 5 days. Twenty-five trials were given each day. A second group of animals was trained in the same apparatus with a slightly different procedure. they were never permitted to escape the shock no matter what kind of response they made. This group started out in much the same fashion as Group A, but after the fourth day they did not "advance," even with as many as 500 trials. This group did not develop a consistent cage-turning response. Instead, they ran on some trials, while on others they "sat tight, held their breath, and tensely awaited the shock."

Shall we say that the lower percentages in B indicate less learning? Actually, the B-group received a greater number of shocks. Surely they have learned "what-follows-what" as thoroughly as the A-group. If the experimenters had chosen to record heart rates and respiration rates they could

FIGURE 40. Conditioning of guinea pigs with and without escape. Group A, able to escape shock; Group B, no escape [From Brogden, Lipman, and Culler, p. 110.⁴]



have shown a steadily mounting frequency similar to the A-curve. Indeed, it is probable that the guinea pigs who learned the “neat solution” of turning the cage and avoiding the shock would show a *decrease* in their heart and respiratory activities. The case is similar to that of any novice who loses the “emotional” component as he gains in skill. The warning honk of a machine from the side-street may produce large visceral-autonomic components in the unskilled automobile driver. The experienced one who has the “recipe” for meeting the situation experiences a smaller disturbance.

Response differences interpreted There is a difference in the degree of freedom of the animals, however. The B-group are caught in a situation where the shock pursues them no matter which response they give. The A-group have an avenue of escape as definitely as though a door had been left open. In the B-group *any* reaction carries the animal *into* a shock stimulus; All responses have this consequence. The responses of the A-group have differing consequences. One response, the rotation movement does not meet the inhibiting shock; instead, it leads to escape, to “no-shock.” What water is to the thirsty animal, this safe area within which no shocks are felt must appeal to the anxious animal expecting shock. Thus the reinforcing framework of the A-group favors the running response. In the B-group the reinforcement is applied indifferently to all responses—running or crouching, punishment follows. The reinforcement operates non-selectively, and the failure of the curve to rise is a graphical expression of this fact.

In this discussion we have described the direction of learning as though it were forced upon the animal by the external stimuli, by the framework; and considering the type of reinforcing stimulus this seems reasonable. There are other learning situations where the relative potency of the stimuli is determined by the organic state of the learner, by the motivating conditions. Thus, for a thirsty animal, any responses that lead to water would be

avored; while for the hungry animal responses leading to food would have an advantage. We shall see later (page 301) that CR's built up under the condition of hunger do not show the same strength when the animal has just been fed. Perhaps we could look upon the present situation as one calculated to create a tension-toward-escape. The act of rotating the cage, which brings *release* to the A-group, is made the dominant response by this fact. The same movements in the B-group do not become prepotent. The consequences of an act determine whether the act persists, becomes dominant in the behavior hierarchy, or is gradually eliminated. In the authors' words: "The functional significance of a CR is crucial in deciding what form it shall assume"⁵

THE STABILITY OF THE CONNECTIONS

The importance of the reinforcing stimulus is further demonstrated the moment it is withdrawn. If we repeat the CS without the supporting UCS the strength of the connection falls. For example, if we test the ancient maxim "practice makes perfect" with our experimental animal and evoke the CR (leg flexion) by repeatedly sounding the metronome (CS) alone, we find that—contrary to the maxim—the flexor response grows weaker with each repetition, the CR moving back along the time line (increasing latency) until it finally ceases altogether. The repetition of the CS without the reinforcing UCS leads to the extinction of the CR. This procedure is called *experimental extinction*. This breakdown in the sequence of reactions reflects the changed external situation as faithfully as the original establishment of the CR reflected the "what-follows-what" of the conditioning situation. If the experimentally induced CR is the prototype of habit we should expect habits to be pretty fluid and changing. There is nothing here that looks like deep-worn grooves in the nervous system. The changes induced by conditioning are reversible. Neither do the CR's look like "mechanical" reactions which persist irrespective of their consequences. On the contrary, they suggest a kind of rationality in the most simple of our habits: when the expectancies that conditioning sets up are "verified" (that is, reinforced) the CR's persist; but if they are unsupported by the real (reinforcing) world, they disappear. Since the world surrounding the individual is continually changing it will be continually forcing an abandonment of the no-longer-valid expectancies. The waxing and waning of CRs will be a daily occurrence. To the extent that growing up means meeting new standards of a new age-group, and to the extent that what is permitted at one level is

tabooed at the next, training will have to force out what previous training has established at the preceding age-level

Experimental Extinction

In the laboratory the extinction process is readily demonstrated. When human subjects have been so conditioned that their eyelids close regularly to the warning light, the withdrawal of the shock (UCS) produces a weakening of the strength of the response. By the 15th unreinforced trial all but one of a group of 20 subjects conditioned in one experimental study had ceased to give the CR.⁶ Half of the subjects had ceased to respond by the 6th unreinforced trial (In their original training series ten of the subjects had received 50 paired presentations, and half had been given 25 paired presentations. In both groups all subjects were giving CR's on every training trial after the 20th pairing. Rapidly established, the CR is also rapidly extinguished.)

Spontaneous recovery If the extinction trials are discontinued as soon as the CR fails to appear, and the subject is not tested again until 24 hours have passed, the first presentations of the CS in this re-test period will again elicit the CR. This *spontaneous recovery* does not restore the CR to the full strength possessed on the last reinforced trial. A second extinction series will not require as many unreinforced trials.⁷

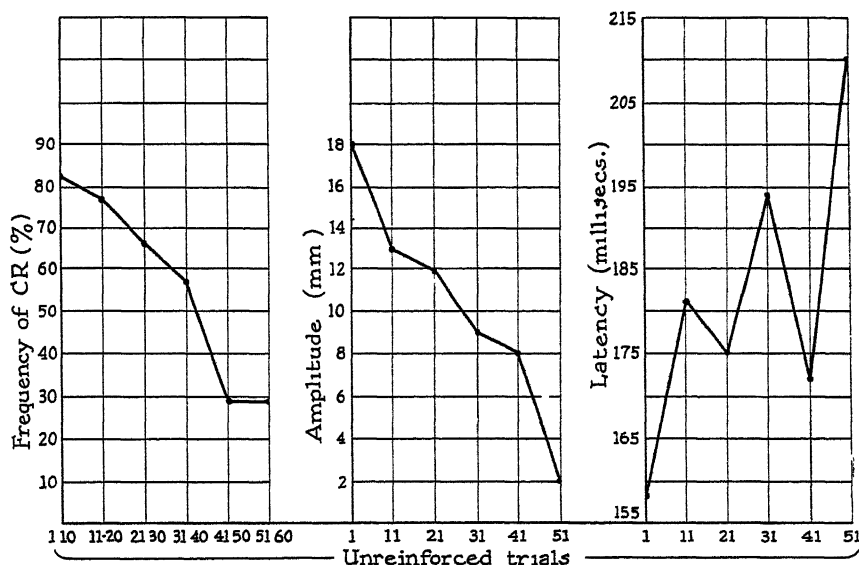


FIGURE 41. Extinction of conditioned eyelid response to light (in dogs). [From Hilgard and Marquis, p. 46.]

Extinction below zero (silent extinction) If the unreinforced trials are continued beyond the point where the CR has disappeared, the *spontaneous recovery* will be less complete, and if re-conditioning is later attempted a greater number of reinforced trials is required to produce the maximum frequencies and amplitudes of the CR.

Overlearning There is also an increase in the strength of the CR if the reinforced trials are continued after frequencies and amplitudes have reached their maximum. Such an increased strength can be demonstrated by the CR's greater resistance to extinction. In this case, however, the increments of strength per trial grow less and less until the additional trials fail to produce a measurable increment. It is probable that similar relations hold for extinction. In this latter case there is an "overlearning of not responding", and it seems probable that continued non-reinforcement would make it increasingly difficult to re-establish a CR. Again one would expect a law of diminishing returns to operate.

The effect of alternating conditioning and extinction series If the conditioning and extinction processes are alternated it is found that both phases require fewer trials with each succeeding cycle until a point is reached at which a single conditioning trial is sufficient to reinstate or extinguish the CR. This should serve to remind us that, although the CR is extinguished, the subject has not forgotten the training experience. The changes in behavior are cumulative.

An experimental study by Brogden, Lipman, and Culler illustrates the principle summarized above. Four dogs were conditioned to flex a foreleg to a tone, the UCS being a shock. The CR was extinguished and then re-conditioned to 100 per cent strength (25 CR's in 25 trials). Two of the dogs were given 400 non-reinforced trials after the CR had disappeared, two were reconditioned at once (without any "extinction below zero"). Re-conditioning required more shocks in the former case, although the differences were small. An average of 13.75 shocks neutralized the 400 trials "below zero" and reinstated the CR at full strength, while 5.25 shocks reinstated the CR of the other group. The unreinforced post-extinction trials (sometimes referred to as "silent extinction") do not greatly weaken the strength of the connection. Thus the un-learning of a connection resembles the learning. The greatest differences in the strength of a connection are produced in the first 15 or 20 trials (whether of conditioning or of extinction). Repetition is required, but a principle of diminishing returns sets in very rapidly, 200 trials are *not* ten times as effective as 20.

The cumulative effect of training was measured in one animal whose CR's were alternately extinguished and re-conditioned 7 times. The first re-conditioning after the first extinction required 18 shocks. The second re-conditioning required 11 shocks. The third, after 450 trials "below zero" had been added to the preceding extinction series, required but 5 shocks, the fifth (again with 450 trials "below zero" interposed) required *one shock only*. The seventh re-conditioning (with 850 trials "below zero") required two shocks.⁸

Ellson found confirmatory evidence of the same principle in studying the extinction of the lever-pressing response conditioned in the Skinner box. Twelve experimental animals (rats) averaged 46, 16, 6, 6, 5, 3, 2, 1, 1, 0, responses in a series of 10 successive extinctions.⁹

The Effect of Instructions upon the Human Subject

These cumulative effects of past experience affect the results of conditioning experiments with human adults. If we explain our procedures thoroughly to our subject, indicating that the warning stimulus will be followed by a shock, our verbal stimuli mobilize old CR's of the subject. Thus Cook and Harris found GSR's *on the first presentation of a CS* (green light).¹⁰ Their subjects had been instructed that a shock would follow the light. Six subjects gave an average of 12.5 CR's (without any actual shock reinforcement) before extinction was complete. In comparison, five subjects who had been given 30 paired presentations of CS-UCS (but no instructions) showed 18 CR's before extinction. Five additional subjects who had experienced 30 presentations of the UCS along with the green light were told that the shock would no longer follow the light. These subjects gave an average of 1.4 CR's only.

Similar results have been reported for the human eyelid reflex.¹¹ Twenty-five out of 40 subjects who had been informed that a shock to the cheek area would follow the closure of a key (by the subject) showed a CR on the first key-closure. After a training series half of the subjects were informed that the shock would be discontinued on the following trial and on all subsequent trials. Six subjects gave no CR's whatever in the extinction series, 2 gave 1 CR, 3 gave 2 CR's, 4 gave 3 CR's (median value, 2 CR's). Half of the subjects were not informed of any change as extinction began. Under this latter condition, every subject continued to give CR's (median value, 5 CR's). One subject commented to the experimenter, on the 12th non-reinforced trial, "The shock seems to be getting awfully weak."

THE RELATIVE EFFICIENCY OF TRAINING METHODS

Factors Affecting the Rate at which Conditioning and Extinction Occur

The experiments on human subjects, just cited, indicate that the subject's *understanding* of the procedures affects both conditioning and extinction. The results suggest that in these cases the process involves more than the mechanical linking of isolated responses, and that the experimenter and his procedures affect *the whole subject*. The subject, on his part, is responding to a total setting, and is utilizing all of his experience. If the subject understands electric circuits, the operation of switches, and if he has some guess as to the purpose of the experiment (and such understandings and guesses mean previously formed CR's) then his reactions tend to be appropriate to the situation-as-understood. His reflexes will behave in quite a different fashion from those of the inexperienced animal. This would mean that with an experienced and intelligent subject the appearance of a CR depends to a very great degree upon the subject's perception of the relationship between cue (CS) and its consequences (UCS). The number of reinforced presentations need not be large. If he already has a base of experience, the function of the training is to isolate and sensitize the relevant responses, to make them "stand out" from a background. The pairings are, in this sense, "for information."

Human subjects often show their puzzlement at the beginning of an extinction series and, in trying to be helpful, ask if something has gone wrong, or suggest that a connection must be broken. If we explain that nothing is wrong, that from now on there will be no reinforcing stimulus (for example, a shock) the CR's tend to disappear promptly. This suggests that a continuing expectancy acts as a support for the reflex, facilitating its appearance. Such a factor may help to account for the results of Humphreys, who found that if reinforcement occurred irregularly and in but *half* of the training trials, a *greater* number of extinction trials was required to produce the same decrement in the response.¹² In this procedure the non-reinforced trials during training are frequently followed by reinforced trials. The beginning of the extinction series does not, therefore, affect expectancy in the same way as in the usual procedure. Since, in the training, non-reinforcement had been followed by reinforced trials, the non-reinforcement had acquired a "sign-character." It had acquired a meaning of "more reinforcements to

come." Thus the non-reinforced trials at the beginning of extinction would tend to energize and keep active the expectant set. In one experiment with human subjects Humphreys used GSR's.¹³ He has since confirmed the finding on the white rat, using a lever-pressing response Skinner had found similar results, earlier.¹⁴

Spacing of trials Training trials may be crowded closely together, or given at widely spaced intervals. The evidence indicates that the gain per trial is greatest when trials are spaced (even up to the point where but one trial per day is given). The effects of spacing trials during extinction are less easy to evaluate. Contradictory results have been reported by different investigators, some indicating that the crowded trials speed up the extinction process while others report that spaced and unspaced trials produce similar rates of extinction. At the moment the issue seems to be unresolved.¹⁵

Forced Extinction

In the usual extinction situation there is no strong force operating counter to the CR. To be sure, the dog lifting his foreleg has to shift his weight, lift the limb against gravity. It would be easier to stand still. And perhaps it is this counter-factor of inertia favoring the posture-of-standing-still that finally displaces the CR. In the eyelid closure the CR interferes with vision and operates counter to the dominant posture of a waking and alert subject. In analogous fashion the conditioned GSR will operate against those mechanisms that maintain bodily temperature; for the sweat glands help to maintain the balance between bodily temperature and the temperature of the milieu. If we view the extinction process as the replacement of a response by one that is antagonistic to it, then it will be the slow and insistent operation of these mild but continuing counter-responses that brings about the disappearance of the CR.

Brogden, Lipman, and Culler ran a series of observations on two of their dogs, prompted by this line of reasoning. At the conclusion of a conditioning series which brought the CR to 100 per cent strength (25 CR's in 25 trials) they withdrew the reinforcement and *added punishment* for each CR that appeared. Their apparatus was so designed that, at this point in the training, if the dog flexed his foreleg during the sounding of the CS (1000 cycle tone) a shock was automatically applied to the thorax via an electrode attached with a belt. One dog, which had required 337 trials to extinguish the CR when the training shock was simply withdrawn, now lost the CR in 75 trials. In a second animal the thoracic shock forced out the CR in 150 trials. When the foreleg response was again restored to 100 per cent strength by re-

introduction of reinforcement, and the usual extinction method was again tested, the CR persisted for 1000 trials, the CR still functioning at 80 per cent of its maximum size. Thoracic shock, introduced at this point, caused the CR to disappear in 175 trials.

Recovery from forced extinction A study by Estes introduces important qualifications.¹⁶ While punishment can bring about a rapid inhibition of overt responses, the recovery from the effects of punishment is often equally rapid. Using a Skinner-box technique, Estes established a bar-pressing response in a control group of rats. When the response had reached a desired strength (as measured by the number of bar-pressures within a standard observation period) the food-reinforcement was withdrawn. The rate of response gradually fell, and the results produced a typical extinction curve.

A second group (experimental) was trained until their bar-pressing response was at the same strength as that shown by the controls at the beginning of their extinction training. The experimental group was then given punishment during the first 15 minutes of extinction, each time the bar was pressed a circuit was closed, introducing a shock from the grid on which the rat was standing. The response rates dropped rapidly. When punishment was discontinued, however, the rates recovered. In order to extinguish the tendency the total number of non-reinforced trials was as great as for the controls. In this experiment the recovery from punishment produced a rate of responding at some points on the curve (see Figure 42) actually greater

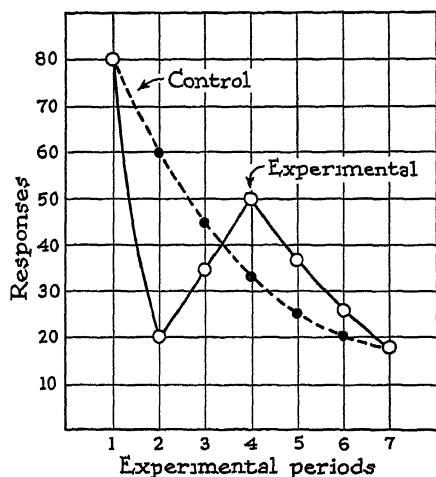


FIGURE 42 Schematic curves comparing the course of extinction for two groups of animals (1) *control* group with non-reinforcement; (2) *experimental* group punished during the first period for each pressure of the bar, then treated on subsequent days to same procedure as controls. Punishment brings a rapid drop in rate of bar-pressing, but the subsequent recovery produces rates above the level of the controls. The final elimination of the tendency requires as many experimental periods. Empirical data indicate that the rate and extent of recovery depend upon intensity of punishment as well as upon the strength of the response-tendency undergoing extinction. [From Estes, p. 4.¹⁶]

than that for the control group. The punishment had temporarily suppressed overt responses; but the results suggest that the covert expectancy that food-pellets would appear following bar-pressure had not been eliminated.

If we look upon extinction as involving a learning that certain consequences will *not* follow an act, we will then note that punishment that suppresses the act also prevents this kind of learning. In anthropomorphic terms we would say: "he fears to press the bar but still *believes* that such pressure would produce food-pellets."

It should be added that Estes found that a sufficiently intense punishment, combined with non-reinforcement, reduced the number of extinction trials required to produce a lasting inhibition of the bar-pressing. He also observed that strong response tendencies were more apt to show the type of "recovery-rebound" illustrated in the experiment reported above.

The Effect of Delayed Reinforcement

The term "delayed reinforcement" has varied meanings depending upon the setting and training procedure employed. The reinforcing stimulus in *classical (or Pavlovian) conditioning* is the UCS which follows the CS, or warning signal. Where the human eyelid reflex is being conditioned the shock to the cheek just below the eye, or the puff of air directed upon the cornea, are the *reinforcers*. If the CS's (buzz, flash of light, and the like) are placed in various temporal relationships with the UCS, learning rates are affected. Figure 43 shows the learning curves for six intervals lying between 0.1 and 0.4 seconds, studied by Kimble.¹⁷ The results indicate that simultaneity of CS and UCS is *not* a favorable training interval. This study, and one by Bernstein,¹⁸ suggest that efficiency of training is at its peak when the interval is between 250 and 400 milliseconds, that beyond this peak longer intervals are again less efficient, that CR's are rarely formed in the backward direction.

A *delayed reflex* may be established by gradually extending the interval CS-UCS. Pavlov used a buzzer sounding continuously for 5 seconds; at the end of the interval meat powder was given. By gradually extending this interval the CS continued to alert the animal; but the response of salivation did not occur until some time had elapsed. For example, when there was a 3-minute interval between the onset of the CS and the UCS, the average number of drops of saliva secreted in the six 30-second periods was 0, 0, 2.6, 2.3, 4.3, 5.3. In this procedure the training has to set up two opposed tendencies: the food is expected, but not at once. The too-prompt reactions have to be extinguished; and the inhibition that develops with this extinction of the pre-

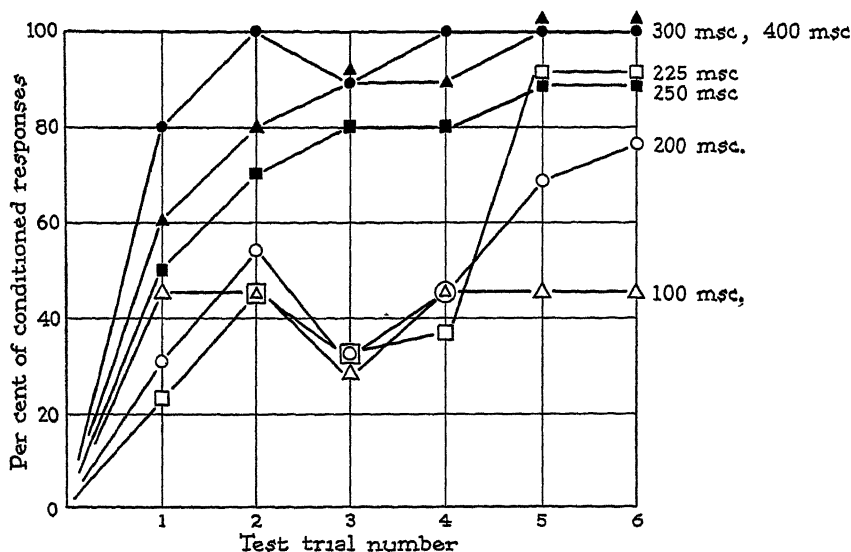


FIGURE 43. Learning curves showing the effect of varied intervals of time between CS and UCS. The curves show the per cent of subjects in each group giving CR's on each test trial. Time intervals (in milliseconds) are shown at the right. [From Kimble, p. 7.17]

mature responses has to be countered by the delayed reinforcement. The animal has to maintain the alerted posture, to inhibit salivation, and *then* to salivate and eat. These are difficult responses for the animal and the child who seem to live so much in a "here and now" and to prefer responses of the all-or-none variety.

Pavlov described dogs who went to sleep in the waiting period, as though the inhibitory action had spread (like a chemical diffusing over the cortex) until all responses to the experimental field became inhibited. Behavior during such waiting periods varies, however. Liddell, using shock to the foreleg of his sheep, extended the waiting period to 30 seconds while the CS (metronome) sounded once per second throughout the interval.¹⁹ In the first inhibitory phase the sheep stood, alert, with the leg movements suppressed; but with each click a tremor or start passed over the sheep and each of the legs would be lifted in turn *except the left foreleg* which was given the shock. Then as the end of the period neared the CR appeared with each CS, though only the 30th was reinforced. The strain of expecting and inhibiting, of preparing yet withholding, proves too much for some experimental animals. It might be compared to the strain in troops waiting for an attack. Action, *any* action, comes as a release.

A second form of delayed response has been studied. In this instance the CS is presented momentarily, and then discontinued, the fore-period of waiting for the UCS is left "unfilled." Pavlov called the conditioned responses established by this method "*trace-reflexes*," implying that they were set off by a "trace" of the response to the CS. In Pavlov's thinking such a trace was a persisting neural state in the brain of the subject. There has been much speculation as to whether there are such reverberating circuits. Certainly at the high speed of nervous impulses (400 feet per second) we would be forced to think of an interlocking system of neurones in which a continuously flowing circuit is set up. It would be much more in accord with the actual neuromuscular arrangements to think of the circuits as organismic and postural rather than as purely neural. There is no question that the CS normally registers its effect throughout the organism. The respiration, heart, sweat glands, the posture-maintaining striped muscles, all show the impact of the stimulus. Witness the GSR responses to faint stimuli in the study of emotions. These peripheral structures, in turn, affect the central integrating mechanism through afferent paths bearing impulses to the cortex. It would seem logical, therefore, to consider the total organism as the locus for these reverberating, continuing, "sets."

An experiment by Anderson and Parmenter shows the rise and fall of this state of readiness to react under a special conditioning procedure.²⁰ The subject, a sheep, had been conditioned to expect 4 positive stimulations (tone reinforced by shock), separated by 7 minute intervals, and the series had been repeated over a period of more than a year. The response had become very stable, the magnitudes of the reaction showing little variation from trial to trial. In a special test series the second CS was allowed to fall at some point within the interval. These tests were widely separated, and the responses were always restored to maximum before the next measure was taken. The results show that the course of excitability falls rapidly after the CS has appeared at its normal temporal position and then rises gradually to a maximum at the fifth minute of waiting.

These trace reflexes are difficult to establish in animal subjects. They are easily extinguished, highly generalized. Krasnogorski believed that they could not be formed in the child before the second year, and in the mentally retarded child not until a later period.²¹

Delayed reinforcement in avoidance training Warner trained rats to jump across a low barrier (7/8 of an inch high) when the grid upon which they were resting was electrified.²² Following this training a buzzer was introduced prior to the onset of the shock. Four groups of animals were

tested at different buzz-shock intervals (1, 10, 20, and 30 seconds) While individual differences were so great that too much reliance cannot be placed on the precise results obtained, it is evident from Warner's results that the 30-second interval proved to be beyond the capacity of his subjects.

Delayed reward in instrumental learning In instrumental learning a response brings about the reinforcing state of affairs (for example, pressing a bar releases a food-pellet, turning down an alley brings the animal to the food box). The reward can be withheld, introducing a delay between the instrumental act and its consequences

Wolfe taught rats to run a simple T-maze, and introduced detention chambers on each arm of the T just before the ends of the two alleys. Rats were held for intervals varying from 0 to 20 minutes. With 5 trials per day the zero-delay group were making more than 90 per cent correct choices by their tenth day, the 20-minute delay group remaining at a level only slightly above chance.²³

Using more complex mazes and holding animals in the final goal box for intervals of 0, 1, 3, 5, 7 minutes before feeding, Hamilton found that the change from zero to 1 minute delay produced a doubling in the number of trials required.²⁴ The longer intervals did not differ significantly. In an obstruction box technique, in which the grid-crossing was followed by delays in feeding, the largest drop in number of crossings occurred in the transition from zero to 15 seconds delay.

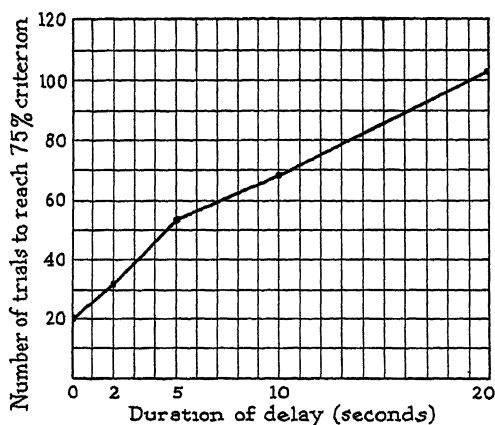


FIGURE 44 Effect of delayed reward upon learning. [Based on Perin.²⁵]

Learning a discrimination with delayed reward (instrumental conditioning) Using a modified Skinner box technique Perin trained 6 groups of rats in bar-pressing.²⁵ Moving the bar in its horizontal slot brought the usual food-pellet. When the habit had been established and the preference

for right or left movements determined, the setting of the apparatus was changed so that (1) moving the bar in the preferred direction brought no food, (2) moving the bar in the non-preferred direction produced (a) disappearance of bar and (b) food-pellets after delays of 0, 2, 5, 10, 20, 30 seconds. The curve plotted in Figure 44 shows the mounting difficulty of the task as reward was delayed. In the 30-second group 9 out of 25 gave up bar-pressing altogether.

Delay of the instrumental acts Delay can be introduced at an earlier point in the sequence of acts. The animal may be restrained while he sees one of a pair of food-cups baited. As soon as he is released he will dash to the proper cup, provided the interval of delay is not too long (see Figure 45). A typical set of scores from the observation of a young monkey (mangabey) under delays varying from 10 to 120 seconds is shown in the following table.

Percentages of Correct Responses at Different Intervals of Delay

PERIOD OF DELAY (SECONDS)	NUMBER OF TRIALS	PER CENT CORRECT
10	40	100
20	30	97
30	50	90
45	60	88
60	60	75
90	30	67
120	30	53

From C. F. Jacobsen, J. Elder, and G. Haselrud, "Studies of Cerebral Function in Primates. I. The Functions of the Frontal Association Areas in Monkeys," *Comparative Psychology Monographs*, 13, (1936).

This capacity to delay has been studied in great detail. It varies from species to species, increases with maturity. The span of delay is increased if, instead of merely seeing the cup baited, the animal is allowed to secure a pre-delay sample of the food from the baited cup. Increasing the difference in appearance of the cups, or their backgrounds, their distance apart, increases the limit of successful delay.

The capacity to delay is especially vulnerable to surgical removal of tissue from the foremost tips of the brain *if both tips are removed*. This area is more highly developed in the higher animals, especially in man. Unilateral injuries to this area and local injuries to other brain areas have little effect upon the capacity. Experimental bilateral injuries to this pre-frontal area

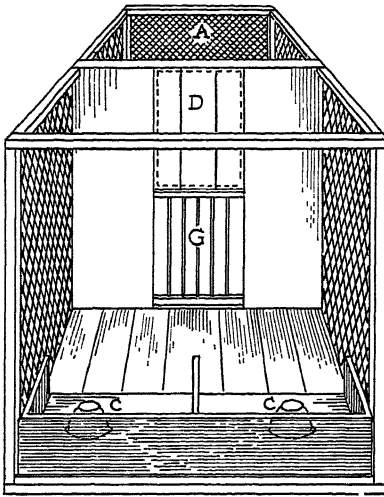


FIGURE 45. Experimental cage used in studies of the capacity to delay *A*—compartment in which the animal is kept during the delay period Through the portcullis grille (*G*) he can see one of the food-cups (*C*) being baited. *D*—solid door. [From Jacobsen, Elder, and Haselrud, p. 16.]

on monkeys showed that, in the post-operative tests, delays of from 2 to 5 seconds reduced performance to chance levels, although *immediate* choices were still correct in 90 per cent of the trials.²⁶ This performance can be improved by utilizing all the “helps” mentioned above (pre-delay feeding, and the like),²⁷ so we must conclude that the capacity is impaired by the operation rather than completely destroyed. Malmö discovered that if the animals were kept in complete darkness during the period of delay they could respond at near normal levels. It is possible that in the operated animals persisting sets are more easily disrupted by the intervening visual cues.

The gradient of reinforcement All of the various measures of the effect of delaying reinforcement have indicated that the temporal field within which responses fuse readily is a surprisingly narrow one. The span across which it is possible to store responses to stimuli, to use instrumental acts as a means to delayed ends, to attach signs to delayed significates, seems to be less than a minute and possibly little more than 30 seconds; and within this interval the gradient of reinforcement drops sharply. Small wonder that the rat learns the turn into the food-box first of all, the turns at the beginning of the maze much later. The effect of the reinforcement spreads backward, slowly, secondary and tertiary anticipations being grafted on the root CR formed as the animal turns down the last alley to food.

In the very young learner these “momentary fields” are as yet discrete. Each change in the field comes suddenly and unexpectedly. The organism is unprepared, easily thrown off balance, redirected. Stimulus is followed im-

mediately by response; the storage period is brief. With the linkages as yet unformed the stimuli have little or no meaning, no "sign" (forward-pointing) quality.

As development proceeds the organism grows expectant; its posture is organized and attentive; and it is "set for" a wider field. The imperious control of the local stimulus declines, stimuli are viewed, gradually, as stimuli in relation, and responses are withheld until appropriate and expected releasing cues arrive. The horizon moves back. The scientist sits working out his equations, designing an apparatus and plotting alternative outcomes which will not emerge for months to come. The observer notes a significant fact which will find its validating reinforcement in the distant future. The light pattern on the horizon sets the crew to reefing sails, battening down hatches, altering the ship's course.

Neither the stimuli employed, nor the settings, nor the animal subjects commonly employed in conditioning experiments are calculated to emphasize these higher organizations. The stimuli are as meaningless as the experimenter can find (for the student of learning desires to study *new* connections). The relationships employed are highly arbitrary (the sound of bubbling water as a sign of shock-to-come). Only in this fashion can the experimenter discover the underlying limits to capacity, the properties of this fusion-process. But this selection of experimental materials makes behavior seem much more a matter of discrete, reflex-like, responses than it actually is—at least in the mature adult who lives in an organized and familiar world. Here the gradients of reinforcement drop off with much less abruptness, the future exists in an expectant present; temporally and spatially remote portions of the field are organized into one meaningful whole.

GENERALIZATION OF EFFECTS OF TRAINING

The after-effects of conditioning are not limited to the specific stimuli employed in the training process, nor are they confined to the laboratory setting. In the Cornell laboratory it was observed that the sheep, shocked in the laboratory whenever a tin dish containing oats was exposed to view, avoided a bucket of oats placed on the barn floor. When the animal is trained in the laboratory to flex its leg when it is tapped over the ribs, the reflex will appear when the animal is tapped while in the flock. But the sheep will also start and run, avoiding the experimenter before contact is possible. The training has resulted in new responses which did not appear in the training

trials, and in responses to new and slightly different stimuli (bucket of oats instead of the pan of oats in the laboratory).

The new responses appear as a result of the greater freedom of movement. In the laboratory the sheep was confined, the shock to the foreleg was inescapable, the flexion reflex inevitable. The harness effectively prevented other escape-avoidance responses. In the barn the animal is out of the harness and there is no electrode on the leg. It is free, therefore, to use other appropriate responses. Hungry, it is drawn toward the bucket of oats. Yet to approach the bucket is now dangerous; conditioning has established "associated consequences." The animal's behavior strikes the observer as a compromise between the avoidance-approach conflict. The sheep circles round the bucket, but carefully avoids coming too close. (One is reminded of the thirsty rats, in an experiment by Cook, whose drinking cup was made the active electrode of a shock circuit. The animals approached the cup cautiously, keeping body and shoulders away and stretching out their necks to reach the water, alternately advancing and retreating before making contact.²⁸)

Turning to the stimuli that have acquired new reaction-invoking powers we shall observe that, whereas a metronome beating 90 times per minute was used in the training, other rates (for example, 50 per minute, 130 per minute), other repeated auditory cues, and even the isolated sounds produced by buzzer, whistle, or bell, now arouse the flexion reflex in spite of the fact that these stimuli had never appeared during the training period.

The Generalization Gradient

As might be expected, this generalized after-effect of training produces the greatest amount of change in the reactions to those stimuli that most closely resemble the CS. Thus, training the animal to react to a warning sound (CS) produced by a source vibrating at 1000 d v /sec. (double vibrations per second) will alter the reaction-invoking-value of *all* audible frequencies; but the reactions to frequencies nearest that of the CS (for example, 1025, 975) will show a greater change than will be the case when more remote rates (200, 2200) are used. An experimental demonstration of this principle was made by Humphreys, using the galvanic skin reflex.²⁹

Generalization in Trace Conditioning

The greatest spread of generalization occurs within the particular sensory field within which the conditioned stimulus lies: if the CS is a sound the generalization effects are greatest among sounds, if the CS is visual, then

other visual stimuli will show the effects of the training, and so on. Two instances in which training-effects spread to *other* modalities may be noted: trace-conditioning and configurational conditioning. In the former the CS is separated from the UCS by an interval of several seconds. In this interval only the *trace* of the CS (the reverberating neuromuscular circuits set in motion by the CS) remains to be joined to the UCR when the latter occurs. The results of this type of training suggest that in the interval these circuits lose some of their identity and arouse more and more remote reaction-systems. In this instance generalization-effects to other sensory fields are common.³⁰

Generalization in Configurational Conditioning

In the second instance, configurational conditioning, the *shape* or organization of the stimuli becomes determinative, and the effects are not limited to the modality of the CS. Thus training to a metronome rate will affect responses to a visual or tactual rate. Razran showed that training to a pattern of lights would generalize readily to similar patterns composed of lights of different colors.³¹ Compared with similar generalization to single lights the generalization to the *pattern* of stimuli seems greater in amount and more persistent. An identifiable shape or relationship provides a "bridge" for generalization to new groupings of stimuli which are similar in organization but different in *content*.

If the generalization resulting from training with a specific CS were to affect *all* stimuli alike, we might even hesitate to call the results learning. Although the stimuli have clearly altered behavior, the change in behavior is not adjusted to any specific pattern of environmental change. To choose a concrete example: if after the metronome-shock training, Liddell's sheep were to flex its foreleg not merely to the metronome rate used as CS, but to all other rates, to flashing lights, to tactual stimuli, and so on, and if the strength of the response was in no wise proportional to the similarity between CS and generalized stimulus, we should have a case in point. The animal is altered by the procedure, and measurably so; but the alteration is not adjusted to any specific pattern of press. The sheep has not learned *what follows what*, and his reaction is wholly indiscriminating. The training in this case has made the foreleg-flexion a dominant response. A reaction has been sensitized; but it is not sensitized to any particular kind or pattern of stimulation.

DISCRIMINATION

Learning to Limit Generalization

In the early stages of conditioning, where generalization is at its peak, the major portion of the effects still lie in the modality of the CS and adjacent to it. Progress in discriminating the true CS (that is, the only stimulus that has been reinforced) is commonly brought about by the *method of contrasts*. This consists of random presentation of CS and "generalized CS," always reinforcing every presentation of the CS and never reinforcing the "generalized CS." This brings about the gradual *extinction* of the generalized effects. A generalization of this extinction process also occurs, acting on the reverse direction and causing a temporary reduction in the power of the CS. Continued reinforcement of the CS, and non-reinforcement of other stimuli, will bring about an increasingly accurate discrimination. The CR will then appear in response to the CS while no response will be given to the non-reinforced stimuli. There is, of course, a limit beyond which discrimination cannot be pressed. This "difference threshold" represents a limit in the sensory and perceptual capacities of the experimental subject.

The most rapid progress is made by beginning with gross contrasts and then proceeding from such coarse differentiation to the ultimate threshold. If, instead of such easily established coarse contrasts the experimenter chooses closely similar stimuli, near the discriminable limits (for instance, two metronome rates of 120 and 110 per minute) the training results in *greater* generalization. This amounts, subjectively, to random reinforcement of the *same* stimuli. The subject tends to give the same response to all rates. The effect of such premature introduction of similar but non-reinforced stimuli is to make all discriminations more difficult. On the other hand, widely separated, contrasting, easily discriminated stimuli, gradually introduced, prevent the development and spread of this "confusion effect." Pavlov found that a discrimination technique that pressed the experimental animal to make discriminations that were beyond his capacity would produce a "breakdown" under training conditions. In this matter it is clearly important that the experimenter adjust the pace of the training to the rate at which the learner's discriminations are developing. To push beyond this natural pace is to risk a regression to an earlier period of confusion. (Describing our own mental states under such conditions we would say that we lose confidence, that we grow emotional, that we no longer see clearly what we are about, that we resent the arbitrariness of the experimenter.)

We may summarize, briefly. In discrimination-training the extinction process operates in such a way as to eliminate the generalized effects of conditioning, the CS retains its power since reinforcement continues. The generalized effects disappear because the similar but not-identical stimuli are never reinforced.

Gradients of Reinforcement and Extinction

Every presentation of the CS with reinforcement increases the strength of the connections between all other stimuli in the same sensory field; but the *other connections are not strengthened to the same degree*. Every non-reinforcement of the generalized stimulus decreases the potency of the CS as well, but *not to the same degree*. Because this gradient exists the experimenter is able to teach a sheep to lift the foreleg to the metronome beating 60 per minute, and to stand quiescent when it beats 120 per minute, by a procedure that presents the two stimuli alternately and reinforces the former only. If the slope of the gradient is too gradual (if the generalized effects are nearly as great as that upon the CR proper) or if the objective similarity of the stimuli is too great (for example, rates of 110 and 115 per minute) alternate reinforcement and non-reinforcement do not yield a discrimination. The CR is lowered in the non-reinforced trials, the generalized responses increased in the reinforced trials, and in similar amounts. A stalemate is reached. In order to break such a stalemate the experimenters have to choose even more widely separated stimuli.

Pseudo-Conditioning

A state of affairs approximating a complete and indiscriminate generalization has been demonstrated by Harlow, Sears, Grether, Harris and others.³² In this case the *sensitization* that arises as a result of the conditioning procedure does not depend upon the pairing of the stimuli and, therefore, is not a true conditioned reaction. One reaction is not associated with another specific response. Rather, one reaction seems to have been so sensitized that a wide range of stimuli now arouse the response, whereas they had been incapable of doing so prior to the procedures. To illustrate: a series of flash-light explosions, each resulting in a start of fear, sensitized this fear response so that a bell, previously shown to be neutral, now elicited fear.³³ Bell and flashlight were never paired. A second procedure, mentioned by Beritoff, consists in giving an experimental animal (pigeon) a few shocks prior to the repetition of a bell-shock sequence, and thereby facilitating the rate with which the CR is later formed.³⁴ Sears gave repeated shocks to goldfish, and as a result light and vibratory stimuli which had never been paired with

the shocks acquired the power of evoking responses qualitatively similar to those called out by the shock.

Generalization of Emotional Responses Developed in the Course of Conditioning

Nothing succeeds like success, and nothing is so conducive to defeat as failure. The forces of the personality seem to rise and fall together, as a group. We feel the toughening in the fiber of our successful friends—their pronouncements lose the saving qualifications they once had, they are ready to pass judgment even in areas where they lack experience. Success is intoxicating; it seems to free them from all timidity and hesitancy . . . and humility.

The converse is also true. The “traumatic” effect of failure appears in its generalized results as well as in the specific area where defeat was encountered. Disappointment in love affects more than the youth’s attitude toward women. It affects his confidence in himself; he is less of a fellow, he embarks on *other* enterprises with less assurance. On the other hand, to the successful lover the whole world is a rosy place. His projects multiply, his hopes are boundless. Every prospect pleases, and *no* men are wholly vile. All the world loves the lover, for all can feel the radiance he turns upon them (all the world save that portion whose bitterness deepens and whose self-esteem shrivels at the sight of the success of others).

These generalized attitudes can be seen as we watch the learning process. We may look upon any training situation in two ways, seeing it as (1) a guiding and restraining framework containing the conditioning stimuli that arouse and integrate *specific habit patterns, postures, skills*. We see the learner acquiring *knowledge about* the setting, learning “what follows what,” and moving in a manner determined by (and appropriate to) the pattern of incentives. Or we can look at the more general effects upon the *learner*. He succeeds, or fails; he is satisfied, or frustrated. He finds the experience easy, or threatening. This residue of tension, exhilaration, depression, anxiety, satisfaction, frustration (and the compounds of affective residues vary with different training situations) remains as an emotional afterglow, as a perseverating organic state long after the specific actions of the training situation are past. The learner carries away these residual states with him, and they provide a continuing substratum for all of his activities, although we shall expect these attitudes to be revived with especial force when he again returns to the learning situation that gave rise to them. Their effect may be sthenic, energizing, supporting; or asthenic, enervating, depressing.

For most of us these emotional substrates will fluctuate rather widely, rising and falling with our current successes and failures. The genial compliment will color the activities of an entire day, a single success will energize our "power to affirm" in other situations. At times the mood swing may be more enduring, failure inducing further failure until a self-reinforcing cycle will be set up. In the asthenic phase these enduring moods are referred to as "vicious cycles." Trapped in a depressive mood, the individual's output falls, his own self-distrust validates every criticism, his enfeebled effort yields fewer successes, and every fresh failure reinforces the asthenic mood. Or, tense and insecure, he may see threats where none are intended, generate resentment in others by his own compensatory over-reactions, and in the counter-actions which his compensations evoke from those around him find a new "objective" basis for his insecurity. The therapeutic task in such a setting is rendered doubly difficult by this latter fact, and since others have now become involved (through the social consequences of his acts) the pattern is fixated, reinforced, supported, by the interpersonal situation. It cannot wane like a gradually forgotten defeat since it is now revived by the actions of those who surround him. It is not a passing state, like fatigue, which will be repaired by the homeostatic powers of the organism. It lives, rather, in the interpersonal setting, and it is constantly reinstated. Breaking the cycle, under these conditions, would seem to involve handling these interpersonal relations.

MOTIVATING FACTORS IN CONDITIONING

Needs, Incentives, and the Conditioning Process

The conditioned-response approach to the learning problem stresses the importance of the stimulus configurations, their intensities, timing, spatial and sequential arrangements. We have looked upon the new patterns of response as stimulus-determined, or as experimenter-determined, as *forced* upon the organism. The organism has been taken for granted, treated as though it were a passive set of structures awaiting the instigating stimuli; and apart from the new integrations forced upon it, a more or less constant factor, always the same. It is now time to modify this emphasis, for it is not wholly correct. Even in conditioning the organism is not an altogether passive affair; results vary with organic states, needs, expectancies of the learner. Even with every attempt to control the conditioning environment there is a great amount of variability in the results as we pass from subject to subject.

Liddell's sheep and Pavlov's dogs have to be laboratory-broken before they are suitable subjects for quantitative experimentation. In this procedure the sheep is fed on the conditioning stand (with another animal nearby) until it will enter the laboratory and mount the table under its own power. After considerable training the experimental animal will lead the experimenter into the testing room, tugging at the leash. When the harness is first fastened to the animal the latter struggles, and so long as these diffuse reactions are occurring it is impossible to get any regular curves for the increase in intensity or frequency of CR's. The animal is a diffuse mass of irregular muscular activity. We cannot direct its "attention" to the stimulus. Until the animal has quieted down, until it is adapted to the harness, until it has finished with all the frightened sniffing and "investigating," its "attention" to the cues we offer will be sporadic, uncontrolled. Finally, however, the variable behavior becomes extinguished, the "strangeness" of the laboratory environment disappears, and the animal comes to stand attentively waiting the cues and the food. This tensed, expectant, and directed posture, now fixated upon the locale from which both CS and UCS usually appear, is the characteristic groundwork upon which the CR's are built. With human subjects we can get this directed attention very rapidly by our verbal directions; and in a great variety of experimental work this directional factor has been found to be extremely important.

Characteristically, too, the training schedule follows a fairly definite relationship to the routine of waking-sleeping-feeding. The necessity of such constant relationships in the conditioning of salivary responses would seem fairly obvious. For example, the warning stimulus regularly preceding the appearance of food will have a different sort of response-invoking power if the animal has just eaten to satiety from that which it will possess for the animal entering the laboratory from a 24-hour fast. To the satiated animal the appearance of food is a matter of indifference, if not a cause for aversion. To the hungry animal the appearance is eagerly awaited; the expectant posture and the salivation testify to the potency of the instigating conditions.

If an experimenter were to disregard these tidal rhythms, his data would not yield those regularities we have already seen (such as generalization gradients, regularly increasing strength with successive repetitions). In short, we cannot neglect the organism and its needs. It is neither passive nor unchanging. The potency of a physical stimulus, as well as the nature of the response (or its direction), varies with organic conditions.

Needs and the Experimental Neurosis

Evidence of these fluctuating organic conditions has often appeared in preceding accounts of behavior. For example, in Masserman's "experimental neurosis" training, in which the animal becomes quite unable to tolerate the flash of light which indicates that the freshly baited food-cup is about to rotate into place, we could describe the frantic flight in response to the warning light as a "conditioned fear." But that it is no isolated stimulus-response connection, always operating in a uniform manner, is shown by the fact that if the cat is fed to satiety before being placed in the cage it will lie quietly as the light flashes.

"Thus, Cat 106, after two air-blasts administered during conditioned feeding, developed marked food inhibitions and showed restlessness, wincing, and crouching at every feeding signal, however, when she was induced to eat in the animal room just before being brought to the experimental cage, she often lay quietly relaxed away from the food-box and showed only minimal phobic or compulsive reactions, such as slight startle or blinking to the light-and-bell signals. Nevertheless, normal feeding responses in the cage were never re-established by this method, and the neurotic behavioral aberrations returned as the hunger of the animal again increased."*

In other words, the neurotic behavior waxed and waned with the hunger-satiety cycle. To the hungry cat, the light was terrifying, to the satiated cat, the light was a matter of indifference. Underlying these facts, of course, is the set of connections established by training. It was the going-to-the-food-cup that had carried the cat into the path of the much-feared air-blast. An observer is prone to treat the calm of the well-fed animal anthropomorphically. Since the warning flash is now no invitation to go to the food cup—a going that would carry the animal straight into danger—the light is no longer disturbing. The cat is simply not "carrying that line" any longer. Having no "desire" to get food (where danger lies) the feeding signal is not terrifying. Viewed from the inside there is now no expectancy of catastrophic events, no imaginative arousal of impending danger, no interest in the light signal, no desire for food. Viewed objectively, there is no organic need, no postural set toward the food-stimulus. The animal lies quietly, ignoring the stimulus or showing minimal reactions to it. It is as though the change in organic

* Jules Masserman, *Behavior and Neurosis* (University of Chicago Press, 1943), p. 73. Used by permission.

state had thrown a set of switches or disengaged a set of gears; the reaction-potentialities are totally altered. The CR's require the support of these general "priming" sets if they are to function.

It is worth noting, also, that the experimenter here permits a degree of freedom to the animal not permitted in the conditioning harness. In the latter instance he is given no choice, the UCS follows the CS in a fixed fashion. In Masserman's box a conditional freedom, at least, obtains. *If* the food-box is avoided no hissing air-blast frightens the animal. And *if* the animal is satiated it is freed from the necessity of approaching the food-box. The animal was never shocked as it lay in the remote corner. And if, even now, the warning light should still be a little disturbing, experimental extinction would set in rapidly, and even this partial "hangover" would be eliminated.

When hunger has been restored, and this freedom has been limited by that fact, the cat's interest in the food-box is restored and the light releases the impulse to go over to the box. Or so we imagine. Overtly the cat does the *opposite*, reacting *against* its food-getting impulse. The light sets off the mewling, the scamper to the far corner of the cage, the posture of fright and withdrawal. Its *impulses* to move toward the food-box must set off the "get-set-for-the-hissing-air-blast" reaction. Through the conditioning with the air-blast-food-getting juxtaposition, the animal's hunger-impulse has become a "dangerous" thing, and the CS that served as a sign of "food-to-come" a threatening, neurosis-inducing stimulus.

A Possible Human Analogy

An analogous situation in human subjects was hinted at in the Benedek and Rubenstein study of the menstrual cycle in women. In a subject who had experienced a great deal of conflict about sexual matters, and who had developed ways of counteracting and repressing sexual impulses, the estrogen phase of the cycle (normally a time of increasing heterosexual interests, increased extraversion of activity, pleasurable emotional tone) initiated instead defensive adjustments, an increase in anxiety (or a depression). They write:

"If previous psychosexual development had been burdened with anxiety or with guilt feelings, the result may be that anxiety is exacerbated and therefore requires a defense against sexuality; this defense might be expressed as a desire not to be like the mother. One of the most frequent symptoms of neuroses in girls at puberty is hostility toward their mothers."*

* Benedek and Rubenstein, "The Sexual Cycle in Women," *Psychosomatic Medicine Monographs*, Vol. III, Nos. 1 and 2 (1942), p. 247. Used by permission of Paul B. Hoeber, Inc.

An analysis of the patients' dreams and free associations frequently gave materials which the physicians interpreted as indicating both the heterosexual component *and* a counteractive striving

Hunger and the Conditioned Salivary Response

Zener and McCurdy have shown a direct relation between the organic state and the strength of the CR.³⁵ In this study the strength of the CR (salivary secretion) was measured after a fast of from 21 to 24 hours, and again after eating to satiety. Taking the magnitude of the CR in the hungry state as 100 per cent, the value for the sated state promptly drops to somewhere between 15 and 25 per cent.*

When the animal is allowed to become hungry again, the re-test following a 24-hour fast shows that the response has returned to 100 per cent strength. The waxing and waning of the *response* with rising and falling motivation does not mean that the "connections" formed in the course of training are obliterated and re-formed. These facts suggest the importance of making a distinction between what the animal has learned, or can remember, and the actual performance (the overt behavior) that is observed under a specific set of conditions.

A SUMMARY WITH CERTAIN QUALIFYING EMPHASES

Although some of the early studies of classical conditioning began with a conception of the process as a *substitution of stimuli* for those that originally invoked reflexes—a mechanically operating process in which mere contiguity between CS and UCS was enough to guarantee a forced linkage of responses—the experimental data have forced a rather drastic revision of such notions.

1. Needs and motivating tensions set a direction for the process and determine the efficacy of reinforcement.
2. CR's established with the support of a need-tension lose their strength when the motivating condition is removed.
3. The relations between cues, the shape and pattern of a stimulus, affect the course of learning, generalization, extinction.

* In one of their procedures a bell was sounded for 25 seconds and reinforced by 6 half-biscuits at the 15th second. The CR measured was the amount of salivary secretion in the initial 15 seconds. Identical procedures were followed before and after eating to satiety.

4. As development proceeds and experience organizes needs, expectancies, the learner cannot be regarded as a bundle of discrete response-tendencies. The cues are no longer merely physical stimuli. The subject's understanding of the field will determine rate of establishment of responses, extinction, and so on.
5. The classical studies failed to distinguish between overt responses and implicit changes. extinction was made the equivalent of forgetting, the delayed appearance of a reaction was taken as evidence of no learning. Learning and forgetting have to be distinguished from performance; suppression is distinguishable from extinction, and so on.
6. The actual responses that appear in conditioning procedures are not identical in form with those of the reflexes they replace. The CR shown in the sheep that expects a shock is not like the gasp the shock produces, the sheep breathes rapidly and with shallow inspiration and expiration and its posture is tense, expectant. CR's have a "forward look" and do not resemble mechanically linked units.
7. The evidence indicates that it is the organism as a whole that is conditioned, rather than neuro-muscular units.
8. The basic interval within which fusion of responses occurs is strictly limited, but the course of development is constantly extending the field that can be embraced within this brief moment.

REFERENCES

1. For the records see a study by E. R. Hilgard, "The Nature of the Conditioned Response. I. The Case for and against Stimulus Substitution," *Psychological Review*, 43 (1936), pp. 366-385.
A diagram of the headgear is shown in a study by A. L. Bernstein, "Temporal Factors in the Formation of Conditioned Eyelid Reactions in Human Subjects," *Journal of General Psychology*, 10 (1934), p. 175.
2. G. V. Anrep, "Pitch Discrimination in the Dog," *Journal of Physiology*, 53 (1920), pp. 367-385.
3. Joseph Miller and L. E. Cole, "The Influence of a 'Voluntary' Reaction upon the Development and the Extinction of the Conditioned Eyelid Reaction," *Journal of Genetic Psychology*, 48 (1936), pp. 405-440.
4. W. J. Brogden; E. A. Lipman, and Elmer Culler, "The Role of Incentive in Conditioning and Extinction," *American Journal of Psychology*, 51 (1938), pp. 109-118.
5. *Ibid.*
6. L. E. Cole, "A Comparison of the Factors of Practice and Knowledge of Experimental Procedure in Conditioning the Eyelid Response of Human Subjects," *Journal of General Psychology*, 20 (1939), pp. 349-373.

7. E. R. Hilgard and D. G. Marquis, "Acquisition, Extinction, and Retention of Conditioned Lid Responses to Light in Dogs," *Journal of Comparative Psychology*, 19 (1935), pp. 29-58
8. Brogden, et al, *op cit*.
9. D. G. Ellson, "Successive Extinctions of a Bar-Pressing Response in Rats," *Journal of General Psychology*, 23 (1940), pp. 283-288.
10. S. W. Cook and R. F. Harris, "The Verbal Conditioning of the Galvanic Skin Reflex," *Journal of Experimental Psychology*, 21 (1937), pp. 202-210.
11. Cole, *op cit*.
12. L. G. Humphreys, "The Effect of Random Alternation of Reinforcement on the Acquisition and Extinction of Conditioned Eyelid Reactions," *Journal of Experimental Psychology*, 25 (1939), pp. 141-158
13. Humphreys, "Extinction of Conditioned Psychogalvanic Responses Following Two Conditions of Reinforcement," *Journal of Experimental Psychology*, 27 (1940), pp. 71-75.
14. B. F. Skinner, *The Behavior of Organisms* (D Appleton-Century Company, Inc., 1938).
15. J. M. Porter, Jr., "Experimental Extinction as a Function of the Interval between Successive Non-Reinforced Elicitations," *Journal of General Psychology* (1939), pp. 109-134
Hilgard and Marquis, *op cit*
16. William K. Estes, "An Experimental Study of Punishment," *Psychological Monographs*, 57 (1944), No. 3, pp. 1-40
17. G. A. Kimble, "Conditioning as a Function of the Time between Conditioned and Unconditioned Stimuli," *Journal of Experimental Psychology*, 37 (1947), pp. 1-15.
18. Bernstein, *op cit*.
19. H. S. Liddell, W. T. James, and O. D. Anderson, "The Comparative Physiology of the Conditioned Motor Reflex," *Comparative Psychology Monographs*, 11 (1934), pp. 1-89
20. O. D. Anderson and Richard Parmenter, "A Long-Term Study of the Experimental Neurosis in the Sheep and Dog," *Psychosomatic Medicine Monographs*, II, Nos. 3 and 4 (1941), pp. 1-150.
21. N. Krasnogorski, "Über die Bedingungs Reflexe in Kindesalter," *Jahrbuch für Kinderheilkunde*, 69 (1909), pp. 1-24.
22. L. H. Warner, "The Association Span of the White Rat," *Journal of Genetic Psychology*, 41 (1932), pp. 57-90
23. J. B. Wolfe, "Effect of Delayed Reward upon Learning in the White Rat," *Journal of Comparative Psychology*, 17 (1934) pp. 1-21.
24. E. L. Hamilton, "The Effect of Delayed Incentive on the Hunger Drive in the White Rat," *Genetic Psychology Monographs*, 5 (1929), pp. 131-207.
25. C. T. Perin, "The Effect of Delayed Reinforcement upon the Differentiation of Bar Responses in White Rats," *Journal of Experimental Psychology*, 32 (1943), pp. 95-109.
26. C. F. Jacobsen, "Functions of Frontal Association Area in Primates," *Archives of Neurology and Psychiatry*, 33 (1935), pp. 558-569
27. J. L. Finan, "Delayed Response with Pre-Delay Re-enforcement in Monkeys after the Removal of the Frontal Lobes," *American Journal of Psychology*, 55 (1942), pp. 202-214.
R. B. Malmö, "Interference Factors in Delayed Response in Monkeys after Removal of the Frontal Lobes," *Journal of Neurophysiology*, 5 (1942), pp. 295-308
28. Howard S. Liddell, "The Conditioned Reflex," in F. A. Moss (ed.), *Comparative Psychology* (Prentice-Hall, Inc., 1942).

Anderson and Parmenter, *op cit*.

S W Cook, "The Production of 'Experimental Neurosis' in the White Rat," *Psychosomatic Medicine*, 1 (1939), pp. 293-308.

29. Lloyd G Humphreys, "Generalization as a Function of Method of Reinforcement," *Journal of Experimental Psychology*, 25 (1939), pp. 361-372.

30. Ivan P. Pavlov, *Conditioned Reflexes*, translated by C. V. Anrep (Oxford University Press, 1927).

31. G. H. S Razran, "Studies in Configurational Conditioning V Generalization and Transposition," *Journal of Genetic Psychology*, 56 (1940), pp. 3-11.

32. J Donald Harris, "Studies in Non-Associative Factors Inherent in Conditioning," *Comparative Psychology Monographs*, 18 (1943), pp. 1-74.

R. R. Sears, "Effect of Optic Lobe Ablation on the Visuo-Motor Behavior of Goldfish," *Journal of Comparative Psychology*, 17 (1934), pp. 233-265.

H. F. Harlow, "Forward Conditioning, Backward Conditioning, and Pseudo-Conditioning in the Goldfish," *Journal of Genetic Psychology*, 55 (1939), pp. 49-58

W. F. Grether, "Pseudo-Conditioning without Paired Stimulation Encountered in Attempted Backward Conditioning," *Journal of Comparative Psychology*, 25 (1938), pp. 91-96

33. Grether, *op cit*

34. J. Beritoff, "Über die Individuell-erworbene Tätigkeit des Zentralnervensystems bei Tauben," *Archiven für die Gestaltphysiologie*, 213 (1926), pp. 370-406.

35. Karl Zener and H G McCurdy, "Analysis of Motivational Factors in Conditioned Behavior. I The Differential Effect of Changes in Hunger upon Conditioned, Unconditioned, and Spontaneous Salivary Secretion," *Journal of Psychology*, 8 (1939), pp. 321-350.

CHAPTER 10

Perceptive Learning

The facts of conditioning are indisputable. Whether we observe the sheep in the harness learning to stand immobile while a metronome beats 120 times per minute and to lift its foreleg when the metronome is slowed to 60, or turn to the human subject giving a lid-closure response to a warning light, the data show a regularity and a lawfulness; and they can be reproduced by any experimenter who chooses to fulfill the conditions. Coupling a warning signal, CS (metronome, light) with a reinforcer, UCS (shock, air-puff) so that the CS-UCS interval is uniform, produces a CR, a new response to the CS. The CR develops slowly, as a rule, gaining strength with each reinforcement. The percentage of trials on which it appears increases with each succeeding training period, the response appears with increasing promptness and vigor. Standing beside the learner, an observer is tempted to imagine a slow process of erosion taking place within—pathways being worn down by the repeated forcing of neural currents through unfamiliar channels, until, through well-worn grooves the impulse flows immediately to the action-system that has been regularly reinforced. We are ready to formulate a law: “A combination of stimuli which has accompanied a movement will on its recurrence tend to be followed by that movement.”¹

The case of instrumental conditioning is more complex; but learning again seems to be a slow wearing down of paths, the cumulative strengthening of the final instrumental act, the gradual attachment of a chain of subordinate instrumental acts to this final one. The gradient of reinforcement, and the generalization process, determine the order in which the chain of responses will be built. The *culs de sac* in the maze nearest the goal will be the first to be eliminated, those near the starting point will tend to persist

longest, and all turns in the goal-direction will share in the reinforcement of the final turn to the food. The curve of errors (and time) will drop slowly; there will be many regressions, recurrent errors, until finally response is chained to adjacent response and the habit runs off without error.

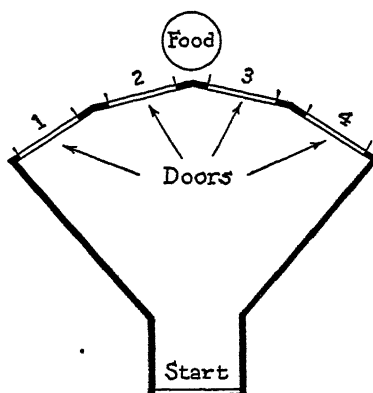
How gradual the selection of the correct path can be is shown by the record of a rat placed in a 4-path multiple choice apparatus of the type shown in Figure 46. In this experiment alley 3 is made the correct path to food. All alleys are closed but alley 3 can be nosed open. The table below records his alley-entrances for 25 trials.² How slowly the "idea" penetrates! The animal persists in making alley 2 his first choice, and he makes 30 attempts to enter alley 4. Finally he settles down to alley 3. Why can't he

Alleys Entered during 25 Learning Trials

TRIAL	ALLEY ENTRANCES
1	3
2	2 1 4 1 4 2 3
3	2 4 2 3
4	1 4 2 4 2 4 2 4 1 4 1 4 1 3
5	2 4 2 4 1 3
6	3
7	2 4 2 4 1 3
8	1 4 1 4 1 4 1 4 1 4 2 4 3
9	3
10	2 4 1 4 1 4 1 4 2 3
11	2 4 1 4 4 2 4 1 4 2 4 1 3
12	2 3
13	2 3
14	4 2 3
15	2 3
16	2 3
17	2 3
18	2 3
19	3
20	2 3
21	3
22	3
23	3
24	3
25	3

remember "Number 4 was closed last time"? Or is the generalization from the reinforcement of alley 3 spreading, each time, to 4? Or is he lumping 3 and 4 into one confused whole (right end)? Evidently the rat is either poor at storing the effects of reinforcement (and he lacks the ability to count and name which would help human beings to preserve the identification of the correct alley), or his response in the first place is a reaction to a vaguely defined area (over on the right end). A human being, one is certain, would solve the problem in prompt fashion! Or perhaps we should specify an experienced or mature human being.

FIGURE 46. One type of multiple-choice apparatus. [Based on G. V. Hamilton, "A Study of Trial and Error Reactions in Mammals," *Journal of Animal Behavior*, 1, p. 34.]



Trial and Error in Infant and Ape

Wishing to compare their learning in a controlled, novel situation, Kellogg studied the behavior of his own 14-month-old son and the 11½ month-old Gua, a chimpanzee adopted (as noted in Chapter 4) for study.³ A slipknot was placed over the child's wrist so that a projecting tail left uppermost could be pulled, loosening the knot. The other end of the cord was secured to the flooring. The child studied the knot, located and pulled the projecting tail, and was free in 30 seconds on the first trial. Gua altogether failed to free herself in the allotted 5 minutes. If the study had stopped at this point the experimenter might have concluded that Donald simply "saw through it at once," or that he "reasoned it out," or that he must have formed the habit earlier. Gua simply showed stupidity.

On trials 2-8 Donald failed each time. He would struggle blindly, cry, fret, or wait stolidly to be freed. On the 7th trial, for example, he started to move away and fell, jerked back by the cord. Directed in this abrupt fashion he turned to the knot and, crying and fretting, tried half-heartedly to get his thumb under the loop. To an adult his arm movements appeared somewhat

random and, more often than not, merely jerked the noose tighter. He over-looked the tail.

It would appear, then, that the success was a chance one; and that, seen or not, the reinforcement was not sufficient to preserve and reinstate it. In the beginning the subjects must have had a rather dim understanding of the procedure, of what was expected of them. We do not know how they interpreted it. Possibly they thought it was a new form of punishment, confinement. They watched the experimenter leave the room, whimpered, got up and walked until jerked off balance by the cord. When these frustrations directed their responses to the knot Gua attacked it with her teeth, Donald with fingers and thumb; but these attacks were poorly organized. The knot was manipulated "in bulk" rather than precisely. The learners could not "see into" the task.

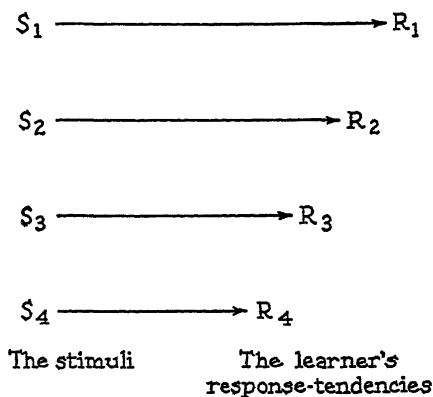
Between the 10th and 15th trials the two subjects changed their approach. It had become a game for them. They seemed anxious to participate, extending their left arms for the loop, running to the experimental board as soon as it was placed on the floor, and then, when the knot was fastened, directing their attack toward it. By the 20th trial both were pulling the tail at once and freeing themselves within less than a minute. Gua, younger in chronological age, but more mature in motor development, had reached the criterion of 4 out of 5 solutions in less than a minute by the 9th trial. Donald was slower, arriving at the criterion by the 20th trial.

The understanding the young subjects had achieved would seem to make the next task, assigned by the experimenter, very easy. The loop was transferred to the foot, again with the tail of the slipknot uppermost. Donald escaped promptly on the first trial, failed on the second, struggled for 3 minutes and 40 seconds on the third, failed the fourth, in spite of the "common elements" in the situation. The insight they had achieved was clearly a precarious thing.

A Conditioned-Response Interpretation of Trial and Error

The maze, the Skinner box, the slipknot confinement, the multiple-choice apparatus, may all be looked upon as complex conditioning situations in which not one but hundreds of stimuli bombard the learner. The latter, in turn, no longer harnessed in the confining conditioning harness, is free to react in a most varied fashion. We may diagram the situation as in Figure 47. S_1 , S_2 , S_3 , and S_4 represent the various stimuli playing upon the learner; the lines to R_1 , R_2 represent response tendencies whose relative strengths are symbolized by the length of the lines. Thus R_1 indicates a dominant response, the first to appear, and one that is apt to recur. In the second slip-

FIGURE 47. Diagram of the conditioning situation.



knot experiment mentioned above, both subjects were prone to react to the slipknot around the ankle with an attempt to pull the loop up the leg toward the body, or with a bending of the knee, pulling the foot toward the body. Both of these R 's tightened the knot (except when the anchorage of the cord was underneath or behind the child) and this response-tendency had to be inhibited or extinguished before the solution could appear. Again Donald was seen to pick at his shoe laces, showing a "generalization" effect from previous trials. All the false carry-overs from previous training have to be eliminated, extinguished; and since in the experimental setting none of these false R 's is reinforced by successful release, that fate is bound to overtake them.

One of the R 's is reinforced. Let R_4 , the weakest reaction-tendency, be the correct response. R_4 would represent the pulling of the tail in the slipknot experiment, entering alley 3 in the multiple-choice experiment, turning down the path to the foodbox in the maze, pressing the bar in the Skinner box. The immediate consequences of this successful act provide a reinforcement of the tendency, increase its likelihood of recurrence; and the associated stimuli, which have operated just prior to the releasing stimuli, will come to take on similar powers as the reinforcement is repeated.

As the trials are repeated, therefore, R_1, R_2 will wane in strength and R_4 will grow stronger. Looking at the controlling S 's we can speak of a rising threshold for S_1, S_2, S_3 and a lowered threshold for S_4 . But the course of these changes is irregular. On one trial S_4 may be enhanced by being placed directly in the field of vision. For example, the tail of the slipknot may be moved by the experimenter so as to make it attract attention. Again, as the strength of R_1 falls, R_2 becomes the dominant one and receives some extinction. Following this R_1 may again become dominant. Between trials there will be some spontaneous recovery, and for the different response

strengths this will occur at different rates. So the profile of "response dominance" will fluctuate from trial to trial. An error will disappear for several trials only to reappear once more and to require further extinction. The curve representing the errors (or time) will be irregular, rising and falling as the component parts of the response hierarchy undergo extinction and reinforcement. The learning facts we have reviewed seem to fit this framework of theory reasonably well.

THE DISCOVERY OF SIGNIFICANT RELATIONS

For most of us this description of the learning process lacks something. While we cannot deny the validating facts, they do not seem to be typical of the best kind of learning; the subject seems too blind, too unaware of what is going on. Have we been too impressed with the way the laboratory animal and the infant learn, forgetting the role of perception and reasoning? Do we learn nothing about the structure and organization of events save as some potent need-reducing stimulus forces order into our behavior?

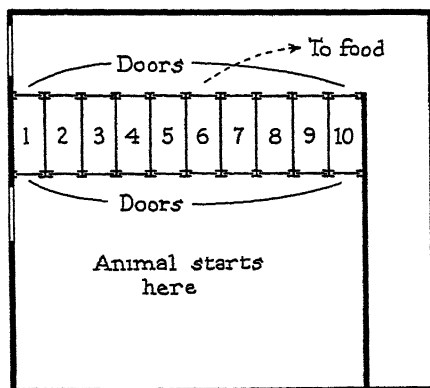
Insightful Solutions in Chimpanzees

In 1917 Kohler published a collection of studies of chimpanzee behavior.⁴ Translated shortly thereafter, it was to have a profound effect upon a generation of psychologists, for he seemed to be presenting facts that denied the universality of the studies of conditioning and trial and error. Instead of blind blunderers his animals seemed intelligent perceivers working with an eye upon the goal, fitting means to ends. They built box-structures to secure food suspended overhead, they used tools to rake in food, they fitted bamboo rods together to make a longer tool; and instead of the correct action gradually emerging out of a complex of random movements, the facts indicated that the solution was an entirely new assemblage of movements, that it depended upon a sensible perception of relationships, and that it came into existence suddenly on one trial. It was not forged out of the other parts, because it did not even employ the parts. It was no gradual stamping in of this response, extinction of that one, until a final complex structure was built. It was new, insightful, intelligent!

The setting is like that for instrumental learning. The ape, reclining in her cage, watches the experimenter place a banana just outside the bars. On the floor of the cage, near the bars, are several sticks, but these lie unnoticed. The ape gets up, stretches her arm through the bars, but the banana lies too

far away. She returns to her place on the floor. Again she tries, and this continues for perhaps a half hour, when she apparently gives up for good. The sticks continue to be non-existent. Finally a group of young chimps playing outside her cage move nearer to the banana, and the ape, galvanized into action, leaps up, seizes a stick, places it beyond the banana and rakes the food into her reach. The solution is repeated the next day, and the next.

FIGURE 48. Simplified plan of multiple-choice apparatus of the type used by Yerkes.



Yerkes reports similar data Using a version of the multiple choice apparatus (see Figure 48) Yerkes set one of his animals the problem of escaping via the *same* opening, no matter which group of escape doors were left invitingly open.⁵ Ten combinations of boxes were used in training. Thus on one trial boxes 2, 3, 4, 5, 6 would be used, on the next trial, 5, 6, 7, 8, and so on. Always box 6 was the open path to food and release. For the chimp Mamo this proved to be a puzzling problem. In 90 trials he averaged less than 50 per cent correct responses. On the ninth day he made five errors in ten tries. Then on the tenth day his errors dropped to zero. In a subsequent test in which a new combination of boxes was left open he chose the one correct box. Suddenly he got the idea—or perhaps we should say suddenly some cue (?) gained control of Mamo. At any rate the curve drops suddenly, as in Kohler's case. Nine days with little or no improvement (although the correct response has been reinforced each time) and then on one day all is learned. (It should be noted, however, that of 14 solutions in problems of this type, 6 showed such abrupt descent. The balance of the solutions came gradually.)

Before we comment on these examples it will be helpful to look at a case of human problem solving, for here we can ask the subject to tell us what is

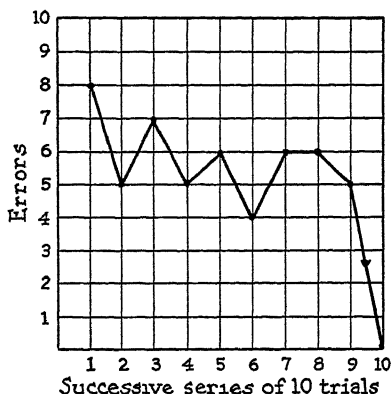


FIGURE 49. Learning curve for chimpanzee (Mamo) in multiple-choice apparatus. [From Yerkes' data.⁵]

going on (in part, at least) inside, what kind of reactions he is making to his successes and failures.

A Study of Thinking

Heidbreder used a series of cards marked with geometrical designs. Her subjects were first taught a symbol for each one of 6 designs (see Figure 50) and then given cards, such as are shown in the second row of the Figure. For these cards an arbitrary task known only to the experimenter determines whether the subject's marking of the card is correct, for example, in one of the series the task is to discover this principle: "Mark the curved figure with its own sign." After each marking the subject is asked to report fully what went on "in his mind." Then he is told whether he was right or wrong.

The first impression created by her results is that the thinking of these subjects is of the trial and error type. Their hypotheses are cut and try affairs, checked by the memory of previous trials, tentative (just to see what will happen). For example:

"I decided it can't be the number of sides, because these have the same number of sides. I think I've tried everything I said I tried, but I feel now that I may have skipped one or made a mistake. I think I've tried upper into under and under into upper and curved into straight and straight into curved and left into right and right into left. These two I had right were going in the same direction and I marked under into upper, so that's what I did here, but it can't be the right theory, because I've had some wrong that way I'm sure."*

* Edna Heidbreder, "An Experimental Study of Thinking," *Archives of Psychology*, 11, No. 73 (1924), p. 31. Used by permission.

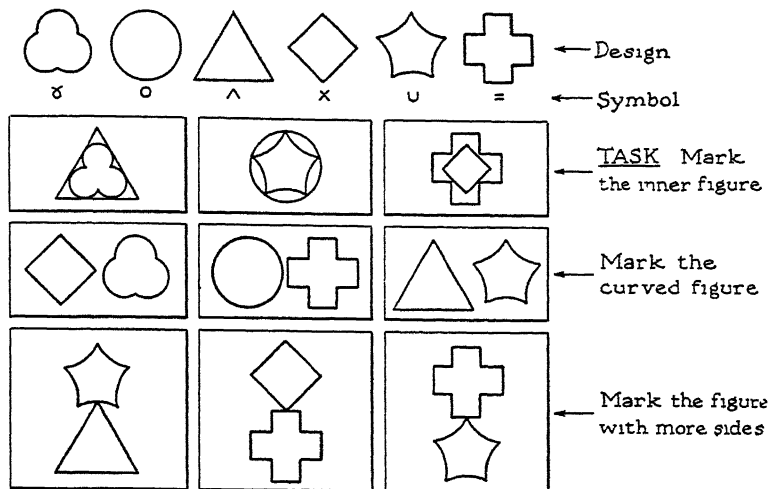


FIGURE 50. Designs and symbols, and test cards, used in Heidbreder's study of thinking.

The major tendency shown by the subjects was to repeat successes and to change their responses following failures. What Thorndike called the "law of effect"* and what others call the "gradient of reinforcement" seems to be operating here, at a verbal-symbolic and implicit level. The thinker is "seeing his way into" the situation by a random and varied series of implicit trials, the solution being gradually selected and validated by the effects that follow upon each response. Reinforcement and extinction are operating to increase and decrease the reaction-tendencies. The problem is complex enough to tax the perceiver's powers to *organize and retain the cumulative effects of the trials*. A success, once made, is not always repeated and errors, one named, are repeated. An implicit form of blundering has replaced the overt form we saw in the animal studies, and the units of response are previously organized habits instead of the simpler responses of the novice.

Occasionally the subject would insist that his hypothesis *ought* to be right (even when the experimenter called it wrong). "It worked before! Wrong?"

* "Of several responses made to the same situation, those which are accompanied or closely followed by satisfaction to the animal will, other things being equal, be more firmly connected with the situation, so that, when it recurs, they will be more likely to recur, those which are accompanied or closely followed by discomfort to the animal will, other things being equal, have their connections with that situation weakened, so that, when it recurs, they will be less likely to recur. The greater the satisfaction or discomfort, the greater the strengthening or weakening of the bond." E. L. Thorndike, *Animal Intelligence*, p. 244. Copyright 1911 by The Macmillan Company and used with their permission.

I don't believe it I think it will work anyway." In this instance the subject's experience had taught him something that was not true. *His* hypothesis had been reinforced by the experimenter's "Right!", but the subject did not see that what the experimenter was judging correct was something other than his own hypothesis. (His own hypothesis: mark the curved figure with its own sign The experimenter's hypothesis mark the smaller figure with the sign of the larger) Not all the subjects could keep this distinction in mind This should remind us that *what is reinforced is what the subject is trying to do* (or what he has tentatively diagnosed as his task) As a result of these complicating factors 38 per cent of the successes were abandoned for some less successful response before the criterion of five correct markings was achieved The errors seemed to control a shift to some other procedure more rigidly, 89 per cent of them being followed by a shift in approach But neither "Right!" nor "Wrong!" guarantees that the subject has isolated, perceived, reacted to the significant relationship An objectively correct response can be made with an incorrect hypothesis or with no hypothesis at all The subject was just tinkering! "Right" in this case invited him to observe the relationships If he failed to observe, the reinforcement was of little help.

Two types of behavior Heidbreder discriminated between what she called *participant* behavior and *spectator* behavior In the former the subject was formulating hypotheses and testing them, trying to make sense of the problem, searching for the underlying principle, the significant relationship When the subject is fatigued, discouraged with many failures, and has run out of ideas, he just tinkers Unless he can locate some significant aspect to guide him in his next try the reinforcement will generalize to any or all aspects of the figure *Identifying and selecting an aspect of the figure for testing narrows the effect of the reinforcement.* While Heidbreder is of the opinion that in spite of its passivity spectator behavior may be registering "the general drift of experience by facilitating the summation of responses not specifically noticed," her data indicate that very few of the correct solutions appeared to arise directly out of these summation effects. In most cases correct solutions came from the progressive sharpening of the definition of the problem, the testing of hypotheses, the shifts away from faulty diagnosis.

BLUNDERING IN IMMATURE AND INEXPERIENCED LEARNERS

An Instructive Failure

Kohler was inclined to attribute the contrast between his own findings and those of Thorndike and others to two principal changes in procedure: (1) he had been careful to make all features of the setting clearly visible, and (2) he had chosen problems that were within the range of comprehension of his subjects. The maze pathways, he felt, had never given the animal a chance to survey the whole, to perceive relations, and the complicated latch mechanisms, such as Thorndike had used in his puzzle boxes, the bars to release pellets from magazines—simple, perhaps, for the human adult—were entirely outside the animal's range of experience.

Yet the significance of the sudden, complete, and permanent solutions, and the nature of the insight process, are obscured by our limited knowledge of the habit-equipment, the background of experience of his subjects. There is a point where "background of experience" actually supplies sufficient training for the establishment of the very habit that is being investigated, and the sudden solution is simply the revival of an old habit. Köhler's reported data indicate that his apes were already used to using tools. For example, they were seen fishing for ants, using straws as extensions of their arms, poking the straws through the wire of the cage to where ants were making a pathway to some food supply. They would wait until the ants collected on the saliva-moistened straw, then lift it to their mouths and draw it through their lips, apparently relishing the slightly acid taste of the ants.

The ape who solved the stick-banana situation was full-grown; but Kohler does not tell us a great deal about her previous experience. If the use of a stick as tool has been well-established prior to her use in the learning experiment, then we are simply confronted with a case of *transfer* of her earlier habits to the experimental station. The original learning has not been observed at all: what we see are generalizations resulting from early conditioning. We need comparable studies of immature learners whose previous acquaintance with tools is known. It is conceivable that the insightful solution with the rapid descent of the curve, the learning in a single trial, represents a precipitation of previously acquired habits which function if and when the learner isolates the appropriate cue or relationship.

Yerkes has reported observations on a young gorilla, approximately five years of age. In a version of Kohler's stick-banana problem the young gorilla came very near to complete failure in spite of a long tuition in which the experimenter made every effort to promote insight. The stick was picked up, and dropped. Right and left arm were used in a dozen tries in the course of an hour, her failures to reach the incentive producing impatience, discouragement. She would cease trying after an initial failure at the beginning of a day's observation, wander about the cage, look about with a peculiarly disinterested air. When Yerkes thrust a stick through the bars (enhancing the tool) she noticed but did not touch it. Moving the food nearer the aperture excited her to action; but she tried to squeeze her head through the opening rather than to reach. On the third day, tests were repeated with four sticks on the cage floor. Again she tried to squeeze through the aperture, whined, begged, reached alternately. Her needs and her struggles had not altered the stimulus-value of the sticks, although she literally stumbled over them as she walked over the cage floor.

Closing the gap The stick was now laid on the food-shelf with one end resting at the edge of the opening. The animal sniffed at the stick, pushed it aside. This was repeated in a second test, and the animal seemed irritated with the stick.

A day later the same problem produced similar behavior. Congo tried to squeeze through the opening, head first, then feet first. She smacked her lips, peered at the food, pushed the stick away; but did not reach. Later, an increase in the incentive (apple, banana, and potato) brought reaching and renewed effort. A stick lying between the grill and the food was pushed aside and then pulled back several times; but her efforts came to nothing.

On the 5th day there was again some reaching and some manipulation of the stick, but to no purpose.

Setting imitative copy A week after the trials had begun Yerkes introduced a variation in his procedure. He raked the food toward the grill, using the stick as a tool, then pushed it away, repeating the performance some half dozen times at intervals. He concluded his final demonstration by placing one end of the stick against the incentive. Congo immediately grasped the stick, moving the apple as she did so; yet nothing came of this. The "copy" was set once more and again it caused Congo to manipulate the stick. This time the food was swept within reach. When the stick was placed at a slight distance from the apple, on the next trial, Congo showed no interest in the tool.

Repeated demonstrations by the experimenter excited the animal's interest, especially when one end of the stick was left in contact with the apple; and on these occasions she would grasp the stick and draw it toward her, but with little evidence of "insight." If the stick lay on the far side of the piece of apple her movement was successful, if it lay on the near side she made "precisely the same motion" and, failing, abandoned all effort. Yerkes thought that he caught a look of "disappointment, chagrin or foolishness" at such times, but the subject's interest held up through four days of such "copy setting."

A long apprenticeship As Yerkes continued his demonstrations he noted an increase in the active use of the stick, although the efforts consisted of a clumsy, crude, poking of the stick in the general direction of the incentive. The tool was not properly placed; but a stereotyped leftward sweep was abandoned and the tool was used interchangeably in the right and left hands. Occasionally Congo seemed more eager to induce the experimenter to operate the stick than to put forth her own effort (an embarrassing product of guidance that sometimes occurs in human learning situations). Yerkes uses such descriptive terms as the following in describing her movements: crude, clumsy, ill-directed, uncoordinated. The stick sometimes fell from her hands, and her movements of poking, pushing, jabbing, throwing, were apt to push the food even farther away, or to render the tool useless. However, the stereotypy disappeared, and an active use of the stick in a roughly defined goalward direction emerged. Her successes were so rare that recurrent apathy and refusal to work often interrupted the learning.

Although Congo had been working on the stick problem for more than three weeks, the spatial nearness of the tool and incentive was still a vital factor. If the stick was placed with the greater part of its length inside the grill Congo would draw it all the way in and lay it on the floor, returning to her reaching and beseeching. Rarely, she would pick it up again and thrust it through the bars. If the stick was placed on the incentive side of the grill she would set to work promptly. When she first began to pick up the stick from the floor and use it as a tool, her approach to the grill was uncertain. Sometimes she placed the stick lengthwise against the grill and pressed vainly outward.

Not until the fourth week does even this modicum of insight occur. Slight changes in the stick-incentive relations upset her adaptations. They are "visible" enough, if we mean by visible "open to view in the immediately presented geographic field"; but only the *gross relations* are operative as controls of her movements. If the stick lies outside and near the apple she

will use it as a tool (although clumsily), if it is partially or wholly inside the cage it is likely to be pulled inside and dropped. Occasionally it will be used. Performance is still uncertain. A stick proffered from the opposite side of the cage is sometimes used, sometimes not. The more detailed adjustments to small differences in stick-apple positions are slow to appear; and even when she has acquired considerable facility in getting her objective a new relationship may produce failure. Generalization and transfer are precarious.

Saltatory appearance of mastery Yet for all the slow progress in mastery of the essentials of the act, Yerkes thought that he could note an abrupt change on the 25th day of experimental work. A complete success appeared on the initial trial. The stick, inside the cage, was picked up promptly, thrust through the grill, used successfully. Yerkes sensed a "radical difference" as though she had "waked up." Her solutions were definite, unhesitating. The act seemed purposive, directed, an integral whole. After long uncertainty and hundreds of trials the mastery appeared almost overnight.

Congo's inexpertness in the use of the stick was almost complete at the beginning. Before she could see the stick as a "something to lengthen the arm with" or as a "hoe to bring in the food" a great deal of blundering had to transpire. The perceptive intelligence that reaches out to organize the field is not some immaculately conceived thing; nor could such anticipatory organizations order and energize in appropriate sequences the musculature of the forearm and its supporting postures. Congo could no more execute the raking-in movement under visual control—even if she had possessed the idea—than a novice can execute the serve of the national tennis champion merely from observing. As it transpired, "getting the hang of the problem" and "getting control of stick-manipulating movements" developed side by side, slowly, gradually, with many recessions, with intercurrent bouts of irritation and apathy that had to be overcome by reinforcements (and by procedures which provided tasks of such simplicity that success could be obtained).

Stereotypy in the Novice

Kellogg's study of the ape and the child provides another study of immature and inexperienced learners. In a bare room, containing a straight chair, a cookie was suspended out of Donald's reach. Donald (now 17 months of age) and Gua had been using boxes and chairs, clambering over them to secure objects otherwise out of reach on a table. Each subject was given a preliminary trial in which the chair was placed directly beneath the in-

centive; and each promptly secured and ate the cookie. In the first test proper, which followed, the chair was placed one meter away from the cookie. Random behavior ensued: Donald reached vainly for the cookie, ran to the experimenter (as though to ask for assistance), ran to the chair, returned to the experimenter, climbed the chair and reached toward the cookie, pushed the chair (often away from the incentive). In three succeeding tests Donald failed to secure the incentive within 5 minutes. By the 4th trial he had succeeded, and only on one of the following 16 trials did he fail to reach the goal within the 5 minute period. Gua, more mature in her general sensorimotor development (though younger than Donald) had but one failure in 20 trials.

An additional difference became apparent as soon as the position of the chair was shifted each trial. Donald's solution no longer worked. Prior to this shift he had taken a position in front of the chair, with back to cookie; then he pulled the chair through an arc to the right; finally he pushed it forward in a straight line stopping approximately underneath the cookie. The same movement sequence recurred each time, and he attempted to repeat the performance in the new test, paying little attention to the objective and mechanically repeating a series of turns and pushes, sometimes passing underneath the objective (see Figure 51).

Gua, too, was disturbed by the change in position. She readjusted more rapidly, however, looking up toward the incentive as she pushed the chair.

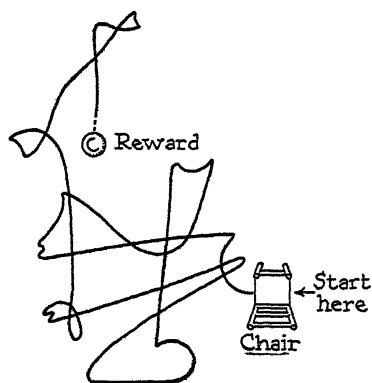


FIGURE 51. Diagram of Donald's movements of the chair in the suspended cookie test [From Kellogg, p. 216.³]

The Long Path to Flexibility

In other tests, involving the use of tools, the subjects were not wholly without experience. Both had learned to eat from a spoon (though neither had acquired facility in using one) and both were observed using a stick, a

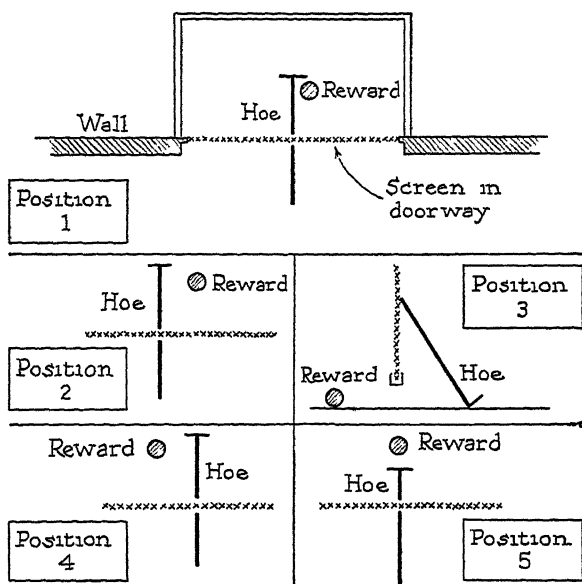


FIGURE 52. Plan showing five positions used in the hoe experiment [Based on Kellogg, p. 224.³]

spoon, a clothespin in pushing objects about, poking holes in the sand, and so on.

When Donald was 15 months of age, Kellogg tested him in what he called the *hoe experiment*. A wire screen, stretched across a doorway (see Figure 52) and extending from above the subject's head down to within 3 inches of the floor, permitted the subject to see the incentive lying in a rectangular compartment on the opposite side, but not to reach it. When the incentive was placed about 18 to 20 inches from the screen, it could be reached by a small wooden hoe with a 2 by 10 inch blade and 30-inch handle. The space beneath the screen permitted the blade of the hoe to slide easily underneath the barrier.

In the first test the hoe was placed in position 1 (see Figure 52) with the blade to the left and in back of the apple. Donald pulled forth the hoe and the apple at once! It turned out, however, that it was the hoe and not the apple that was of primary interest to him. The apple was ignored while the hoe was pushed back and forth. (Clearly Donald's "definition of the situation" was not the same as that of the experimenter.) Gradually his attention was directed toward the apple, and the hoe became a means toward an end. However, when the incentive was shifted to position 2 (see Figure 52) Donald continued to make the same movement, drawing the hoe

straight forward. A training series in which the positions of the incentive were alternated was then instituted. Five trials were given in each session, trials 1 and 5 in position 1, trials 2, 3, and 4 in position 2. With 10 trials per day it was not until the 120th trial that Donald achieved his initial success in position 2, and that accidentally. Progress was laborious, irregular, slow, uncertain. The position 1 trials kept the subjects motivated (for these could be solved). Both subjects entered upon their training trials eagerly and seemed to observe the hoe and the incentive intently. Yet *the spatial arrangements of tool and incentive did not govern the movements*. Improvement was first suggested when Donald began to shove the hoe back promptly if the apple did not come forth. Then he tried to slide the blade of the hoe to the right as though to hook the apple. Occasionally he would push the blade in farther *before* he drew it forth. Finally he combined the pushing and the "rightward hook." The timing of the components of the act (actually a complex pattern of contractions) remained uncertain for some time; his first success was not followed up. By the 200th trial he had made 7 successes ($7\frac{1}{2}$ per cent of the trials following the initial success).

Gua, in the meantime, began with a keener interest in the apple, dropped the hoe and ate the apple on her initial success. When she met failure with the transfer of the hoe to position 2 she grew cautious and drew the hoe out a centimeter at a time. Her initial success occurred on the 99th trial, and by the 200th trial Gua had achieved 9 successes. Gua in the meantime had been inclined to give up altogether on the position 2 trials, walking off without even touching the hoe. Gua achieved the criterion (4 unassisted* successes in 5 attempts) on her 265th trial, Donald on his 337th.

Position 3, in which the hoe was leaned against the outside of the screen, was solved in about 10 trials. Position 4, another *new* relationship, confused both subjects; they pushed the hoe *to the right* on their first two attempts. By the third trial they found the solution and retained it. From this point on they adapted their movements to each change in position. This fluidity in their perceptual-motor adjustments was not achieved, however, until they had had more than 500 varied trials!

* The experimenters introduced guidance at the 200th trial, placing the hands of the subject on the hoe, in proper position, and moving the blade for them. This procedure was followed every 5th trial. There was a marked difference in the response of the two subjects to this guidance. Gua learned to push the handle to the right, and her movements often caused the handle to rotate around the blade as pivot. Donald's movement was superior, consisting of a pushing inward and a turning of the hoe blade about the handle as pivot.

MATURE PROBLEM-SOLVERS

Studies of Mechanical Puzzles

Ruger presented mechanical puzzles to human adults, recording the time for the solution together with introspective reports from his subjects. The puzzles, constructed of wire for the most part, contained separable parts whose removal constituted the problem for the subject. They were of such complex construction that they could not be solved on direct inspection and required considerable manipulation and testing of hypotheses. Unlike the subjects in the studies of learning of animals and small children which we have been describing, Ruger's subjects knew what was expected of them (at least roughly) and were capable of describing "how it felt" when the solution occurred. His subjects were asked to keep up a running fire of observations as their trials occurred. Ruger recorded these, noted exclamations, emotional attitudes, and endeavored to keep track of their moves in solving the puzzles.

There were many features of the learning of these subjects that resembled the performance of the animal and child. The time curve fluctuated in uneven fashion, low values on early trials sometimes being followed by high values on the later ones. Attempted solutions that came to nought were *repeated numerous times although the subject's verbalizations indicated that he expected little from them*. Correct solutions appeared by chance—the puzzle just came apart in the subject's hands, to his surprise. Chance successes were often followed by fruitless trials and a great deal of blundering. In almost all cases random manipulations played some part in the discovery of the successful movement.

Obscure as the problems were, some blundering was inevitable. *It was never mere blundering, however*. The subjects were working to separate the bits of wire. And they seemed to make progress through a progressive narrowing of their problem. The *location* of the chance success, made while working on a particular part of the puzzle, or in making a specific manipulation, was noted. The subject returned to this portion of the puzzle, or sought the steps that would lead into the particular manipulation. The *mere* fact of success, Ruger thought, was of little value. In 128 of his curves he counted 328 sharp drops in the time line from one trial to its successor, and he found that in 70 per cent of these drops the subject had reported a new insight into the significant relationships of the problem. A few of the spurts were unexplained.

The insights the subjects reported were of varying degrees of explicitness. Some involved merely a position, or a part that must "somehow" be manipulated. Some were so vague that the subject could not report on them, and only recognized what was to be done as the problem recurred; that is, they became aware of what came next only when the sign, or cue, was actually present to set off the anticipation, the moves leading up to the cue still operating in random fashion. The best insights were those in which the subject could state the exact principle and in such general terms that applications could be made to similar but in some respects novel puzzles. Some insights were clear enough at the moment of solution, but could not be revived when next the problem was presented. On occasion the memory that was revived had all the clearness of a correct solution, yet was false. Such false memories operated as persistent obstacles to further progress, the valuable variations containing the solution being prevented by the false recall.

Ruger noted that the final movement was frequently learned first of all. And in these cases progress consisted in fitting a series of approaches to the end-response, but this was not a universal order.

Purposive trial and error Although the insights came suddenly, and often unpremeditatedly (in the course of movements made with a different intent) it was the variation that was isolated, noted, and used as an hypothesis for the next trial that formed the groundwork of the permanent gains. Ruger's successful subject is pictured, therefore, as a *purposive tester of perceived relations* rather than as a mere aggregate of reflexes moving in and out of phase, with chance juxtapositions and reinforcements gradually yielding the successful pattern. Even a mechanical method of analysis, such as dividing a two-dimensional figure into four quadrants, yielded superior learning to the purely random repetition of trials. The mere effort to do something different from the last fruitless trial ruled out repetitious errors and facilitated the location of the chance success. But random trials and chance success, mechanical variation, or consciously adopted hypotheses were all interpreted as producing their effects solely because they lead up to the perceiving of relations, an understanding of a principle. Koffka, in a later discussion of the implications of such results for the theory of "trial and error" learning asserts: "The chief function of repetition is to prepare the ground for the construction of an appropriate figure which first occurs as a result of chance."⁶ Koffka states the negative side of his proposition: "Repetitions without the achievement of a configuration remain ineffective whenever they are not positively harmful." In other words, moving the parts of the puzzle about merely gives opportunity for significant spatial

relations to move into view, or to be seen from the revealing angle. Should this relationship be missed even though success be achieved, the one factor that gives any value to the trial has been missed; and the next trial will be as random as its precursor.

Ruger's approach, here, suggests a kind of logic of science. The scientist does not discover the causes of phenomena without hypotheses and a conscious control and testing of these hypotheses. His experiments are not mere blundering, but are designed to isolate a factor that is suspected of having some influence on the phenomenon he is investigating. True, he finds many unanticipated results. The data he accumulates often contain surprising deviations from those he forecast; and this may lead to a re-checking of his hypotheses or to the construction of a new experimental test. But he is engaged in a purposive search throughout; and the rapid consolidation of gains comes when a trial brings validation of an hypothesis. The "hypotheses" of Ruger's subjects were of varying orders of explicitness; but even with the vaguest ones, in which there was a mere sense of the locality of the solution, there was the same forecast, test, and retention of gain.

The significance of trials It is this contrast in the nature of the interpretation of the trial that marks the greatest difference between the observations of Ruger and Kohler, on the one hand, and those of Thorndike and Pavlov on the other. For the latter, the trial seems to serve its purpose in a blind and mechanical fashion. The "consequences" are described as having an effect upon the strength of connections whether they are intended and noted or not, reinforcing the connection if they are satisfying, and weakening it if they are dissatisfying. In conditioning theory, the emphasis is upon the spatial and temporal relations of the *objectively* described stimuli, their repeated recurrence in regular order, and their intensities, rather than upon the *perceived* relations. The reinforcing action of the incentive, in instrumental learning, is viewed as a function of the strength of the drive (usually conceived in physiological terms though *measured* as hours of hunger), the immediacy of the reward, the degree of satiety brought about, and not upon the *perception* of the significant relationships between movement, barrier, and goal. For Ruger and Kohler it is the shape and direction of the drive-tension that is significant, rather than mere amount of tension.

A Continuum Instead of a Contrast

The experiments we have reviewed give us a basis for doubting that we should make too much of the contrast between two types of learning. It would be a mistake to try to force one view of the process to the exclusion

of the other, certainly. That is to say, we should not attempt to reduce *all* learning either to the conditioned-response formula or to the insight formula. The studies of Donald and Gaa, and Congo, show both types operating. In the very young learners the insight emerges slowly, is precarious when it appears. Their movements are clumsy, the tool falls from their hands, their solutions appear to be mechanically arrived at and to apply to a limited number of type-situations. For these young learners the eye is not yet sufficiently in control of the hand for rapid and flexible adaptations to the visual configuration to occur; and the observations seem to indicate that this type of visual-motor control is acquired slowly by a trial-and-chance-success fashion. Once the foundation of motor skills is well-established the advance to new configurational controls occurs with saltatory transitions, and the Gestaltist's* description of these insights is applicable. The fact seems to be that the Gestaltist has chosen to work with subjects who have already acquired this preliminary control. Between the two extremes of the naive blunderer and the sophisticated tester of hypotheses there are many gradations. Insight becomes more sharply defined and flexible with maturity and experience, but the transitions to new capacity levels are not abrupt. There are vague locations of difficulty, self-directions to "do something with the little ring," which fall far short of perception of principles, significant relations.

An Inside and an Outside View

Conditioned response and trial and error theory tends to describe the learning process in objective terms—that is, from a position taken up outside the subject. It therefore counts trials, measures intensities and intervals, hours of deprivation, weights of incentive given per trial, movements made, maze construction, and the like. The Gestaltist has traditionally been interested in visual perceptions, in seen-relations, in how the problem looks to the subject. This involves him in either taking down verbatim accounts given by the subject, or in inferring the nature of his percepts and hunches from his actions. What is most needed is the application of both approaches and both emphases to the entire range of learning problems. Conditioning establishes expectancies, and the term "expectancy" properly belongs to the language of introspection. Objectively, it could refer to a lowered latency in motor or glandular response. Subjectively it is an awareness of a stimulus-to-come, and may even include imagery of hallucinatory vividness.

* The views of Kohler, Wertheimer, Koffka and others are described as *Gestaltist* because of their emphasis upon configurations, perceived relations, etc. *Gestalt*, in German, means configuration.

We found, in examining the results of repeated conditioning and extinction, that the shift in reaction could be induced in a single trial; and we noted that in conditioning human adults verbal instructions alone were enough to set up the CR, or that a single trial following instructions would suffice. And when the conditioned subject is given an "insight" into the significant relations of the wiring set-up and is allowed to throw the switch that breaks the circuit, the repetition of the conditioned stimulus (warning light) no longer calls out the CR. Behind these rapid shifts in "stimulus-response" connections, however, there has been a long experience. The infant makes no such abrupt shifts. Whether we use the language of the Gestaltists, insisting that it is the insight, the perception of relations, that is the crucial thing, or whether we describe the shifts in objective terms, referring to the historical basis in past conditioning, is not extremely important, provided we bear in mind in either case all the relevant factors that have contributed to the phenomenon.

It has seemed, at times, as though the Gestaltist has wanted to explain all of the advances in adjustment of the learner as due to a perceptual-insightful factor operating *in the immediate present*. He tends to stress the configurational relationships, the spatial and temporal relations that permit things to be seen-together, related to goals, and to deny any efficacy to the trial in which there is no such perceptual factor. His learners are always goal-directed, and his learners have an understanding of the nature of the problem.

To the Gestaltist the conditioned-reflex and trial and error accounts have seemed curiously blind and insensitive to the fact of human and animal intelligence. They seem to him to have selected, almost purposively, the poorest possible conditions for learning, where alley-walls prevent a vision of the whole layout, the locks and pulleys are too complex to permit visual analysis. No wonder that the trials seem random, and the results seem precarious.

The Gestaltist on the other hand has been particularly weak on the genetic-historical side. Where do the directions and purposes come from, in the first place? Why is the motor control of the young grasper so slow in achieving accuracy? Why does the virtuoso (acrobat or pianist) need constant daily practice to keep his coordinations up to their optimum? And how did we pass from babbling to connected speech? Was it through the perceptual analysis of the relationship between lip, tongue, larynx, and intercostals and the phonetic melody of our language? The phonetician has scarcely arrived at this level of insight!

Balancing the Evaluation

On the credit side of the Gestalt analysis there is much to be said. The student of conditioning has too often centered his attention upon part-responses instead of looking at the animal as a whole. Confining his animal and forcing out these part-reactions, he has sometimes made unjustified inferences as to what the whole animal would do in a free situation. Conditioned by shock in the harness the animal lifts his foot each time the warning signal is given; freed, he avoids the learning situation altogether.

The objective account inclines the observer to describe physical stimuli in isolation, and to infer that configurational factors are either irrelevant or that the reaction to a constellation of stimuli can be predicted if the parts have been studied in isolation. The Gestaltist has abundantly demonstrated that this is not true. Insights function in one context, and not in another. The mere fact of togetherness, of background, of temporal delays which impede a view of the whole, may render the solution difficult or impossible.

The Gestaltist, stressing the dynamic factors in the present situation, and emphasizing the purposive character of the animal's reactions, the importance of his perceptions in regulating his conduct, has been inclined to neglect the mechanical, historical, physiological aspects of the learning process. At times his criticisms of the objective analysis have been most fruitful. He has pointed out that the objective account of an experimental set-up is frequently a description of "how it looks to the experimenter" and that subject and experimenter are really viewing quite different tasks. On the other hand, the Gestaltist seems prone to minimize, if not to neglect, the historical conditions lying back of the present diagnosis and direction of the subject. The students of conditioning have given abundant demonstration of mechanical factors that operate below the level of (or prior to) awareness. Insights emerge gradually, and the previous connections, automatically formed, affect this emergence. Even the helpless decorticated animal forms CR's.⁷ If we were to universalize the purposive, means-end descriptions, trying to force all instances of learning to fit them, we should have to invent a kind of spinal cord "vigilance" to do the trick. For many forms of acquisition the objective account is both adequate and simpler.

What seems to be required, therefore, is an account of learning that will fuse the objective-historical approach with the one emphasizing present dynamics, and one that will utilize both the accounts of the "behavior environment" and the description of the objective, physical, and physiological factors. The emphases can be mutually helpful and supplementary. They need not be advanced as the slogans of rival schools, as though all the data had to be reduced to one formula or another.

GENERALIZATIONS EMERGING FROM THE STUDIES OF INSIGHTFUL LEARNING

The facts we have reviewed seem to indicate that our instances of learning do not fall into two sharply defined categories. Instead, they can be ranged along a continuum: at one end of this continuum we can place the classical conditioning of the inexperienced animal where control is rigid, responses forced, learning slow; at the other end we can place the purposive search of the mature learner who achieves sudden, insightful solutions as his forecasts find validation in his intelligent adjustment to relations. Along this continuum there are certain aspects of the learning situation that we can single out for comment.

The subjects Mature and experienced subjects bring with them a degree of motor control, an equipment of habits and ready-formed hypotheses. If we select the more mature, the more experienced, and those with greater native capacity, our learning data will approach the upper end of the continuum. In the desire to achieve rigorous control, to simplify the variables with which they must work, a great many experimenters have turned—almost exclusively—to work with the humble laboratory animal. Such experimentation has emphasized traits in the learning process that characterize the subjects more than the whole range of learning phenomena.

Besides bringing an understanding of the problem, a range of ready-formed hypotheses, the mature learner brings an approach. He stands off, surveys the task as a whole, inhibits overt trials until his understanding makes the release of movement a sensible one, a movement with an end in view. The immature animal responds overtly, immediately, reacting to the immediate pressures of parts of the field. Typical conditioning data result.

The learning tasks In the search for truly novel situations experimenters have frequently chosen meaningless tasks so utterly foreign to experience that the subject has no “handle” with which to grasp and perceive them. Even the instructions are left vague and ambiguous.

In addition, in the quest for objectivity, it has seemed necessary to describe the stimuli in physical terms; but the evidence indicates that the situation as it appears to the experimenter, or as objectively defined, is often quite different in the eyes of the subject. Moreover, the field confronting the learner is not a mere aggregate of discrete stimulus points, he sees objects, objects-in-relation. The spatial shapes, the nearness or temporal separation,

the enhancing factors of intensity, motion, color-contrast, together with the sheer complexity introduced by many unfamiliar items, will limit the subject's ability to make something of it. We shall return to a study of these factors which transform an aggregate of stimuli into a perceived field-of-relations in our study of perception.

The trials Blundering trials usually turn out to be more than mere blundering. The subject uses what he already possesses. Only the neonate approximates a mere blunderer. To the degree that a trial is a mere random movement it produces a small increment of skill. The most rapid advances come when the trial is a response with an end in view, an attempt to validate a forecast. The students of trial and error learning were correct in insisting that we learn by doing; but the most efficient doing is not a mere doing. It is a testing of hypotheses.

There is a further distinction: an hypothesis that is used *as such* is more valuable than a mere try. Heidbreder's study showed that fixations often arose when the subject was unaware of the fact that his view of the situation was merely a *possible* view. Because of the fixity of habits of perceiving and responding which the subject brings with him, he may be unable to profit from a trial. Kohler's apes, busy with a box-building problem, could not utilize a box another ape was sitting upon; box-with-ape-sitting-on-it was apparently not utilizable. Similarly, the stick "bound within the bush lying on the cage floor" was not an available stick to use in raking in the banana. The integrity of old perceptual habits limits the flexibility of the trial. The ape could not thrust the whole bush through the bars and could not break off the branch from the totality that remained a functional unit.

The trials are needed, also, in order to reveal properties of the situation that cannot be anticipated at a distance. Just tinkering can bring out consequences, stimulate hypothesis-forming, suggest ways of organizing an attack. But it is the tinkering that leads to a new view of things, a fresh hypothesis, that will be followed by the most rapid drop in errors.

The trials are not just discrete bits of stamping in and stamping out. The subject recalls "the last time"; the trials build a cumulating whole. They also serve to give progressive refinement in the attack upon the problem; a place becomes a knot (in bulk) and this in turn a "tail" which must be pulled in a certain way. Often, though not always, the act is built up in reverse—the final instrumental act, then the means to arrive at this act, and so on.

As the progressive refinement and diagnosis of the task go on, learning becomes an all-but-complete task; and a search is instituted for that which

will close the gap. The struggle to reach reveals that the arm is too short. The arm-too-short becomes a search for a something to lengthen the arm with, and so on. The more behavior approximates this search for a specific kind of something with which to complete an act, the more rapid is the closure, the more there is apt to be a consolidation and retention of gains.

'The reinforcement process "What the learner is doing" is the thing that is reinforced. Success does not stamp in an action that the experimenter sees, or that a kymographic record of the action in a particular muscle group reveals. The animal may be making a right turn, objectively; but if the turn is a turning-to-the-wall, *this* is the act reinforced. Thus it is that the hypothesis narrows the spread of reinforcement. (There are qualifications, here, to which we shall return.)

There are few who would go so far as to insist that without an hypothesis there can be no selective action of reinforcement. The neonate learns. But the difference in the effects of reinforcement under the two conditions is dramatic. One of Ruger's subjects worked for 10 hours, without progress, although there had been many chance successes. Discovery of the nature of his error brought instant solution. Mamo, Yerkes' chimp, achieved solution within a single day's ten trials, after working fruitlessly for 90 trials without improvement.

THE MANAGEMENT OF PERCEPTIVE LEARNING

Looking at the range of experimental facts we have reviewed, who would not choose the insightful types of solutions, the swift transformations of understanding which can be grasped and retained, the sudden descents of the curves of time and error, the selection of the significant relations which are transferable to other situations where common elements may be missing but essential relations still hold? Who would not prefer the flash of intelligence to the cumbersome and blind trial and error which slowly stumbles into an all but unconscious "know-how," or the insightful discovery of a differentiating cue to the mechanically enforced discriminations in which reinforcements, extinction-effects, and mutually interfering generalizations slowly summate in algebraic fashion? And when we have worked out a neat mathematical formula for the curve of extinction (working with the humble laboratory animal) and then discover that with human subjects a sudden hunch as to the meaning of the experiment (that the experimenter no longer intends to reinforce the warning cue) will send the extinction curve tumbling

to zero-strengths for the CR, we are prone to look upon the "laws of conditioning" as upon some subordinate set of principles, as somehow physiological rather than psychological. It is as though a perceptive-cognitive layer had been built upon the slow and cumbersome physiological layer and, assuming control of the latter, is able to turn on and off—in a flash—what the latter's elephantine and somewhat blind algebraic summations take countless repetitions to produce.

The conditioned learner seems, moreover, like a kind of mechanical chameleon with very little "inner determination," taking on expectancies as the environment enforces them and dropping them just as quickly. The conditioned responses seem to be "for this day and train only," good for the duration of this combination of signals and reinforcing stimuli, whereas our habits, in addition to being—as James called them—"our most precious conservative agents" have a compulsive quality about them, a tough resistance to deforming influences, and our memories, instead of vanishing with the speed of our unstable CR's, persist for a lifetime.

Thus, the perceptive learning seems not only the desirable form but the one nearer to the human facts. Yet the conditioning facts apply to human learners, too, as we have found, and neither our wishes nor any fiat can make learning more insightful, more perceptive, than in fact it is. If our learning about learning has been insightful we can see at least three factors that are crucial for the perceptive type of learning:

1. The background of experience
2. The motivation, interest, purposes of the learner, sharpened until the approach to the learning situation becomes a directed search.
3. The layout of the learning situation, the perceptual field with its groupings, emphases.

The Background of Experience

There is such a thing as *learning readiness*. Until the child has developed language, understands the spoken word, discriminates visual forms, names objects and actions he is not ready to learn to read. Until Congo had gone through a long blundering process, exhausting the possibilities of forearm, hand, stick, the young gorilla studied by Yerkes was not ready to make the leap in which the stick suddenly becomes a tool-to-put-behind-the-banana-to-rake-it-in. Until the sensori-motor skills that orient a perceiver in a field and relate him to a temporal-spatial context have developed, he is not ready to grasp the interrelatedness of objects, to isolate the cues that will solve his

problems. And these preliminary learnings are of the conditioned response, trial and error variety. The endless running to and fro, the mouthings and sniffings, the fiddling and pointless manipulations of objects, are but to provide the raw materials for later solutions when integrated expectations go into function *en bloc*.

Latent Learning

There is now an extended group of experiments that can be classified as *latent learning*. Actually there is very little about the learning that is latent, as we shall see; but it appears to be latent because the record of behavior taken during the latency period is incomplete and because, after a period in which nothing is apparently taking place, *suddenly* we see the precipitate—an organization of behavior which solves a problem, reduces a need-tension.

In the typical maze experiment the animal (commonly the albino rat) is introduced to an unfamiliar set of runways, some of which open into a final segment in which an “incentive” (commonly food) is placed. Other alleys end in *culs de sac* (dead-end paths). After a few preliminary trials in which, as in the CR experiment, there is a great deal of exploratory behavior (sniffing, face-washing, napping, and the like) the measures for time and errors fall fairly rapidly. If the animal is well-motivated (hungry) and if each successful run is promptly rewarded with an acceptable kind of food, the animal will finally achieve and maintain an errorless performance. Released from the starting box he dashes promptly to his goal, entering none of the blind alleys, running an uninterrupted course to the incentive box. Random and variable behavior is replaced by a smoothly integrated performance which is neatly adjusted to the maze configuration. Instead of hesitating at the choice points, he begins to turn before the alley-end is reached, rounding the corner in a smoothly integrated sequence of movements.

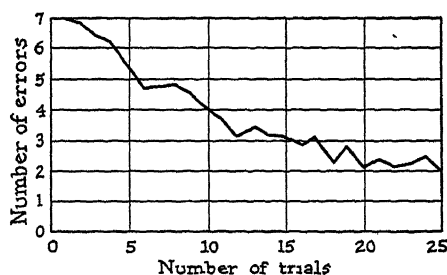
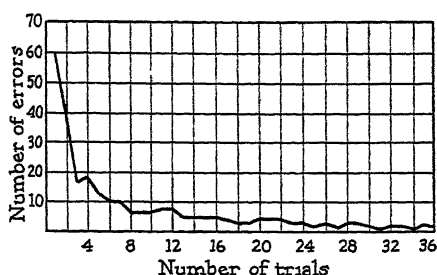


FIGURE 53. Curve of learning for rats in a multiple-T maze. [From F. A. Moss, *Comparative Psychology* (Prentice-Hall, Inc., 1934), p. 307]

FIGURE 54 Curve of learning for human subjects tracing a maze with a stylus [From G D Higginson, *Fields of Psychology* (Henry Holt & Company, Inc., 1931), p 307.]



Figures 53 and 54 show roughly comparable curves for white rats and college students. In the latter case the seated, blindfolded subject learns to trace a grooved pathway with a hand-stylus until a minimum of errors are made.

Figure 32 (page 268) shows a maze pattern used by Tolman and his students in their study of maze performance of rats. Each of the 14 units after the preliminary section contains a choice point, a blind alley, and a section of the true path. The units are joined so that the correct turns are RLLRRLRRL RLLLR. Such a maze is learned fairly rapidly. By the 15th trial (with one run per day) the animals are running the maze with but one or two errors.

Figure 55 shows the error scores for four groups of rats. The "hungry-reward" group ran the maze 24 hours after receiving their last full ration. Following the completion of their run they found food in the incentive compartment and were allowed to eat an amount that was *slightly less than enough to maintain their weight*. (These animals lost from 5 to 26 grams each during the experiment.) This group eliminated errors rapidly. The "hungry non-reward" group were equally well motivated but were never fed until 3 or 4 hours after the day's run. Thus they were given no opportunity to connect the turns into the true path with food-in-the-incentive-box. The delayed feeding took place in their living cages. The "less hungry rewarded"

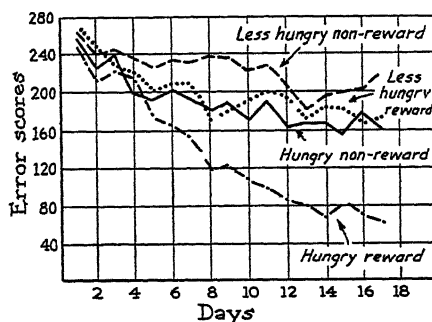


FIGURE 55. Error curves for four groups of rats [From Tolman and Honzik, p. 246.⁸]

group were fed in the end-box and in amounts sufficient to produce weight gains of 4 to 40 grams in 17 days of training. This extra amount of food is the reason for calling the group less hungry. The "less hungry non-rewarded" group was fed 3-4 hours after the daily run, and again the feeding was in the living cages. These rats were also fed amounts large enough to produce weight gains. The curves for the four groups, which show the average number of errors per day's run for each of the four groups of 36 rats, indicate that only the hungry-reward group, which was subjected to strong motivation and prompt reward, show any marked tendency to eliminate errors and to confine their runs to the "true" path.⁸

When the experimenters classified the blind alleys into two groups, those pointing in the direction of the goal and those pointing away from the goal, it appeared that goalward errors were more frequent and persistent. This suggests a sort of generalization, comparable to that revealed in the simpler conditioning technique, a generalization arising from the discovery of food in a certain section of the maze. The first few entrances into a food-compartment (and feeding) increase the amount of time spent in running in all alleys (as compared with face-washing, gnawing, sniffing) and thus alter behavior, producing a sharp decrease in running time in the first few trials. Random exploration gives way to a "seeking," an active running. The analysis of Tolman and Honzik shows that, in addition, *all* alleys pointing in the general direction of the incentive compartment are affected by these first entrances into the food compartment to a greater degree than other alleys (that is, they invite entrance). A general anticipatory goalward-set, a general orientation in the maze, is set up by the early trials.

The effect of motivation and reinforcement is even more apparent if we compare this goalward tendency in the hungry non-reward and hungry-reward groups (see the table below). Almost two-thirds of the errors of the HR group are goalward, while the HNR group shows 52 per cent—scarcely more than chance.

*Errors in Goal-Pointing and Non-Goal-Pointing Blinds
for "Hungry-Reward" and "Hungry Non-Reward" Groups of Rats*

Group	Errors in non-goal-pointing blinds		Errors in goal-pointing blinds	
	NUMBER	PER CENT	NUMBER	PER CENT
HR	838	37	1448	63
HNR	1541	48	1689	52

Delayed introduction of incentives Studies of maze learning of this type demonstrate the importance of motivation and reward. Without a motive the animal does not run the maze in any consistent fashion. One part of the maze is like another. If the animal is placed in the maze *after* his daily feeding he may use the maze as a sleeping chamber, or as a field to explore; but it will have no beginning, middle, end. Likewise, even though the animal is strongly motivated, the end-box will not acquire any great "pull" if it contains no incentive. None of the alleys are a means to an end, or more-to-be-entered than others. Thus it would seem that the function of the motivating factor (for example, hunger) is to introduce a gradient into the stimulus field, to make some stimuli "stand out", to make others retreat. The incentive (for example, food) also serves to release the tensions set up by the motivating circumstances, to stop the series of moves, to "reinforce" the animal's approach response in a particular section of the maze and to affect all other alleys, ultimately, according to their on-leading or thwarting character. (The non-reinforcement of approach responses in the blinds would serve to "extinguish" them.) Whether we use objective terminology, counting direction, rate, force, and pattern of movements, or whether we anthropomorphize—putting ourselves in the rat's place, figuratively, and speculate about goals, interests, desires, perceptions, feelings of frustration, and the like—it is apparent that our description of learning is bound to be incomplete without careful description of these motivating conditions. Common sense has long shared this view: we can learn if we are interested, we neglect that which has no point to it, that which gets us nowhere.

When Tolman and Honzik varied their procedures by removing the incentive from the HR group on the 11th day, the effect of this unreinforced run showed up promptly *on the 12th day*, and in an even more pronounced fashion subsequently. The maze behavior underwent a kind of disorganization, comparable to the disorganization of the CR under extinction procedures. Figure 56 shows this disintegration graphically, the ultimate levels

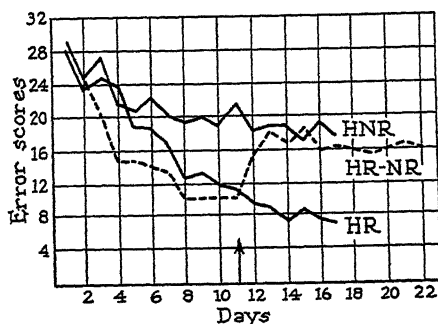


FIGURE 56. Error curves for three groups of rats, showing the effect of withdrawing reward from one group on the 11th day [From Tolman and Honzik, p. 262.⁸]

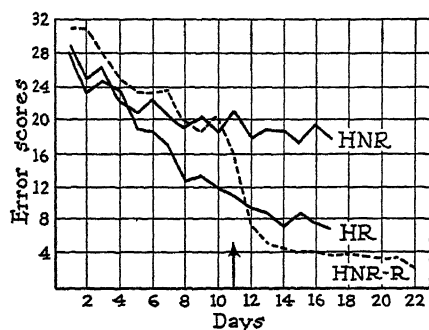


FIGURE 57. Error curves for three groups of rats, showing the effect of introducing reward on the 11th day [From Tolman and Honzik, p. 267.⁸]

of the "hungry non-reward" and the "hungry-reward" from whom the reward has been withdrawn for 3 or 4 days being undistinguishable. The effect of 10 days of "successful" runs is soon obliterated, *at least in so far as the actual measures of performance here plotted go* (There is little doubt that reintroduction of rewards would show a type of redintegration of behavior that would reveal that the effects of maze-experience had been retained.)

A change in the opposite direction is equally dramatic (see Figure 57). Introducing the reward on the 11th day, for a "hungry non-reward" group, brings the error curve down so promptly that on the 12th day the error score is actually below that of the HR group whose trials had been reinforced from the start by the full daily ration

Performance vs. learning These findings again stress the importance of motivation and reinforcement. They do more. They indicate that what is assembled under the force of newly introduced drives and releases depends upon what has gone before. And they indicate that while the animals were sniffing about, entering blinds, and the like, they were learning many things about "what follows what," about relations between the parts of the maze, that "this turn ends in a blind" while "this is an on-leading path." Part integrations were built up as a *cul de sac* entrance was promptly followed by the dead end that forced a retreat. All of these expectancies and response-integrations were built up prior to the introduction of food. This learning of the layout amounts to the acquisition of what Tolman calls a "cognitive map." The animal acquires an orientation in a field, an acquaintance with relation of part to part, and no doubt this fact would be recorded in behavioral changes if we had full records of his *cul de sac* behavior. But the experimenter, with attention centered upon the "true maze path" is prone to record no improvement, no learning, until the day following the introduction of the reward when there is the rapid descent in the error-curve. The

difference between performance and learning turns out to be—in part—a distinction between learnings that were noted and recorded and learnings of which no record was made. The latter were inferred because of the fact that a sudden, otherwise unaccountable drop in the error-curve appeared.

How this knowledge of the layout, this cognitive map, is carried by the rat we cannot say. He cannot communicate it to the experimenter, and he possesses no symbolic skills whereby he could reproduce or otherwise demonstrate its presence. A human subject could draw a map (of a sort). Tolman is inclined to think of it as involving a kind of cortical pattern, brain engram. Whatever its nature it makes possible a variety of “assemblages” of the parts. Wherever the food-incentive is introduced, it serves to crystallize and organize out of this prepared groundwork a tension-releasing pattern. Like the crystallizing idea that suddenly terminates a long period of what seemed to the creative artist to be fruitless endeavor, the polarity introduced by tension and release serves to order the part-responses. But the preliminary training does more than set up mechanically integrated parts, there is a sense of the whole. This sense of the entire layout can be seen in the rat who has been running a maze for days and then, on one day, escapes from the experimenter’s hands just as he is being placed in the maze and runs across the top of the maze in a course that the pathways never permitted him to take, but with good orientation toward the food box. The cognitive map that is built by the background of experience has multiple behavior tracks across it, multiple possibilities.⁹

If we ask, “What is the moral of the story of latent learning?” perhaps the main emphasis should be placed upon the fact that the rapid reorganization of skills under the stress of motivation cannot take place without the preceding skills. The insightful solution is a later phase of learning. Intelligence, reasoning power, are not faculties that make a grand leap to conclusions without the foundation experiences. The moral does not seem to be that learning takes place without any reinforcement, since there was reinforcement in the sense that some events regularly followed others even in the preliminary runs before food was brought in. Would the cognitive map have been built up more rapidly under more effective types of reinforcement? Probably. There is no reason why the foundation experiences about the nature of the world and the spatial field should not be set up under the best possible motivating conditions. But there is evidence that the set of expectancies set up under one type of reinforcement can be utilized under other motivational conditions.

Sensitizing Experiences

The background of experience can also provide a sensitization to aspects and relations of the stimulus field. When chimps are tested in the delayed reaction apparatus (see page 290) they find the greatest difficulty in using color as a cue. If the color is immediately reinforced, good discrimination can be taught in from 60 to 180 trials.¹⁰ But if the color-reinforcement is delayed by as much as 4 seconds the habit proves too difficult. However, if preliminary training in an independent situation sets up reliable and persistent color discrimination habits, then the animals can solve the delayed response problem. Apparently they did not note and store the color reaction; they lacked the power to isolate, abstract, grasp this part of a totality.

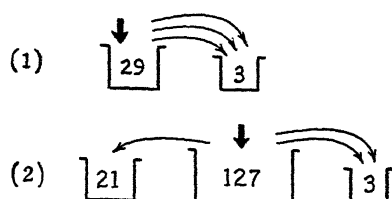
Inhibitory Sets

The background of experience can also provide inhibitory sets, false directions. Working with subjects ranging from 4th graders to Ph D candidates, Luchins presented a series of problems calculated to develop a particular solution-set.¹¹ In one series, for example, he used a version of the old three-container problem. Starting out with a simplified version ("If you had two containers, one measuring 29 quarts and one 3 quarts, how would you proceed to obtain 20 quarts of water?") He followed with a series.

<i>Given empty jars of the following capacities (in quarts) as measures</i>			<i>Obtain the following amounts of water (quarts)</i>
21	127	3	100
14	163	25	99
18	43	10	5
9	42	6	21
20	59	4	31

Diagraming the first solution (part 1 in Figure 58) and the second (part 2), he developed a set as the series progressed. Then he introduced ambiguous problems—they could be solved by the formula $B - A - 2C$, but a simpler solution was available. Thus if the three jars held 23, 49, and 3, and the problem was to obtain 20, another rather simple manipulation would serve. From 70 to 100 of the college groups tested used the roundabout

FIGURE 58. Diagrams of solutions to two of Luchins' water-container problems.



solution instead of the direct one. Direct solutions could be increased by warnings, by interspersed problems that broke the set. When the set had been well developed, interspersed problems that could not be solved at all by the formula proved too difficult for more than half of the subjects although the problems themselves were easier than many they had solved (and gave control groups who had not developed the set no difficulty at all). The ordering of experience has set up an approach to the problem which determines ease of solution, readiness of insight.

A Limitation in the Insight Process: Acquiring New Sensori-Motor Coordinations

The emphasis upon background experiences and basic skills should remind us of a serious limitation in the insight process. We are prone to think, as adults, that if we can only "see into" the problem then we can make all the appropriate movements necessary to solve it, forgetting that there was a time when supporting postures and moving members did not follow or adjust to the patterned cues from distance receptors. The problem does not arise, for example, in the studies of Heidbreder and Ruger. The subjects know how to make the symbols for Heidbreder's figures, how to move the puzzle parts for Ruger. The search is for the guiding cue, the significant relationship, and when this can be discovered the movements take care of themselves. The task is one of learning to perceive.

In the novice learning to produce a foreign language, to execute an intricate dance step, there is difficulty both in perceiving what to do and in actually producing the coordination. He hears the umlauts, nasals, guttural R's, with the hearing-habits he has developed for his own language, and he produces Anglo-Saxon variants of these sounds, even insisting that he is speaking precisely as his teacher. Apparently he cannot *hear* correctly. And the dancing instructor runs up against similar barriers in perceiving and in executing sensori-motor coordinations.

When the instructor in golf or swimming carefully explains the postures and strokes, even putting the novice through the movements, both teacher and pupil may agree that there is an understanding, a cognitive map. But

although the perceptive-cognitive phase is there (and it may even be verbalized) it does not produce the movements. The novice seems to be limited to what he already has. He can pick up and imitate the integrations he has already formed. The patient teacher can do little more than (1) tell him where to begin blundering, (2) devise formulas that utilize these already formed habits but combine them so that they will lead the blunderer near his goal (for instance, tell him to round the mouth as though to say *O* and then say *EE*), or (3) watch patiently for the emergence of a chance success and select it, pounce upon it, emphasize it when it comes. As in teaching your friend to wiggle his ears, you begin with what he has (gross undifferentiated scalp movements). The differentiating process is a slow, trial and error affair. Only when the "know how" gets into the sensori-motor system do we feel certain that the teacher's instructions are fully understood.

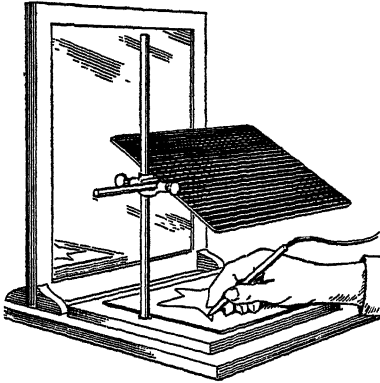


FIGURE 59. Mirror-drawing. The subject is tracing the outline of a star which he can see only in the mirror.

The mirror-drawing experiment "Trace the star-shaped figure" is an instruction a subject can understand, but if he is forced to control his movements as he watches the figure, hand, and pencil through a mirror his movements are hesitant and halting. Even though he knows what he wants to do and is sufficiently motivated, and even though he can verbally define the mirror principle (with diagrams) and can state, "movements to right or left are not altered, movements in depth are reversed," the actual movements he produces are poorly organized, random. At the choice points, particularly, where as in a star-shaped figure a new direction has to be taken, the errors cluster. Eventually the subject can move over the path without errors and as rapidly as was originally possible without the mirror-reversal. When he has sufficient practice with a series of figures, he can take on a new design and assemble the appropriate sequence of movements in one insightful whole.

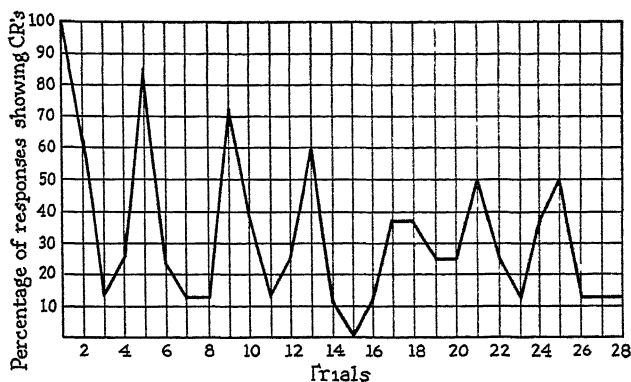


FIGURE 60. Extinction curve showing limits in discrimination. Subjects were conditioned (eyelid response) with a reinforcing shock on 1st, 5th, 9th, etc., trials. In the extinction series, the shock was no longer given. However, the subjects continued to make more responses showing CR's on the 1st, 5th, 9th, etc., trials—even though they knew the shock was not coming. [From L. E. Cole, "A Comparison of the Factors of Practice and Knowledge of Experimental Procedure in Conditioning the Eyelid Response of Human Subjects," *Journal of General Psychology*, 20 (1939), p. 368.]

Limits in Discrimination Training

A similar split between the cognitive map and the actual execution of responses appears in conditioning human subjects. Where the eyelid reflex gets a reinforcing shock on every fourth trial (on the first, fifth, ninth, and so on) the subject very early can verbalize the order of events. To jog his memory a blue light is added to the warning stimulus on the reinforced trials. But the course of sensori-motor learning is a slow one. Figure 60 shows the continuance of the trend into the extinction series, with the positions in the cycle adjacent to the reinforced trial showing more CR's. Though the perceiving subject "knows" when the shock is coming and when it is not, the sluggish organism has not caught up with the cognitive map. The subject does not move as one piece.

So it is that in the actual production of behavior, in the precise skills, the law is practice, practice, and more practice. The virtuoso does not dare to stay too long away from his instrument if he would perform up to his standard of skill and tempo. The dancer who would maintain suppleness and timing has to guarantee the sequence of movements "down among the cells." And it is not only in the skilled *movement*! The implicit skills of rapid computation, quick translation, perceptive diagnosis, need the same support.

Perhaps more than in any other department our daily deportment reveals the split between a perceptive-cognitive map and the actual sensori-motor output. In intention, in plan, we mean so well. Our hours of rising, our discharge of responsibilities, our habits of self-control (in view of the larger plan) are so much easier to verbalize than to execute. We talk a very excellent set of plans, but our moral muscles and our spiritual coordinations show the need of daily conditioning. As William James commented, in discussion of improvement of our habits, re the drinker who has taken the pledge: Allow no exception! You may not count it, a kind providence may not count it, but down among the cells it is being counted, none the less! His excellent chapter on habit is still one of the best bits of moral counsel to one who would do something about his own habits.¹²

Classifying and Abstracting. Cognitive Maps and Strip Maps

We noted earlier in discussing the work of Heidebreder and Ruger that the evidence indicates that it is the "provisional try"¹³—what the learner is trying to do—that gets reinforced or extinguished. We noted that sharply defined hypotheses narrow the spread of the effect of reinforcement, and that it is the trial with a clear hypothesis that teaches best of all. Unqualified, this statement would obscure our insight into the nature of the learning process; and we need to relate it to the problem of the cognitive map.

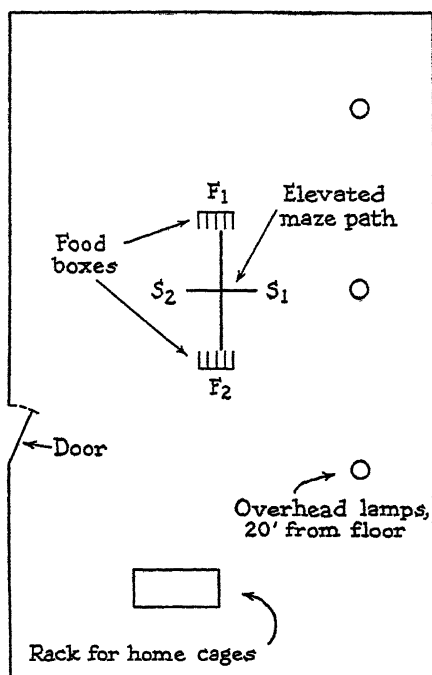
An object, as James reminded us, is a veritable wellspring of qualities. The simple desk ruler is a device to measure with, a straight edge for drawing a straight line, a stick of wood, a prop for a window with broken sashcord, a stick to beat a dog with, and so on. Placed in juxtaposition with other objects, lying in a field that is seen under the stress of a felt want, approached with a set just established in the preceding series of events, now this quality, now that strikes the eye. The ruler itself, the very fount and origin of these qualities, the *absolute* ruler, the *thing in itself*, which only some mystic experience could put me in touch with, this pristine event which could be seen, perhaps, by a recording angel, this is not the thing I experience.

And so it is even with the lowly rat. As he learns the simplest of mazes he appears to abstract, to single out some relationship, to locate and isolate cues. And it is in the course of his dealing with one of these partial aspects of the learning situation that reinforcement hits. The juxtaposition of events can be most arbitrary, his provisional try most incorrect (in view of the relationship really operating), but if the act is followed by a reinforcing state of affairs the act is singled out, emphasized, and the tendency to repeat it increased in strength.

Skinner has reported amusing observations of such "coincidental" learn-

ing in the pigeon ¹⁴ A mechanical feeder, operating once every 15 seconds, brought a food hopper before a hungry pigeon. In 6 out of 8 cases stereotyped responses began to appear. Whatever the bird happened to be doing at the moment of reinforcement began to occur repeatedly in the intervals. One hopped sideways, another made a peck-brush movement toward the ground, another made complete circling movements, another dipped his head and thrust it upward as though lifting something, another leaned forward and moved its head to and fro pendulum-wise. Kellogg has reported similar automatization of useless movements that ride along with an enforced leg-lifting in dogs being conditioned to shock-avoidance. ¹⁵

FIGURE 61. Maze in relation to other objects and parts of the room in which it is located. The curves shown in Figure 62 indicate that rats learned their way in the maze more quickly by orienting themselves to the room as a whole. [From Tolman, Ritchie, and Kalish, p. 224. ¹⁶]



In the maze learning of the rat there is evidence that reinforcement is selective, acting upon *what the rat is doing*; and the data indicate that this has a great deal to do with the formation of the cognitive map, which Tolman refers to. The rat has certain preferred ways of approach. Placed in a simple T-maze (see Figure 61) with food in the chamber on the right as he is released from the starting point S_1 , the turn down to F_1 (as we describe it) may be—for the rat—a turn down the pathway with sawdust on the floor, a turn toward the right flank of his own body, a turn away from the wall where the home cage is located. What is the locus of the act? The body, the maze,

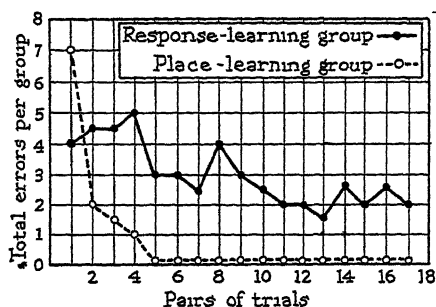
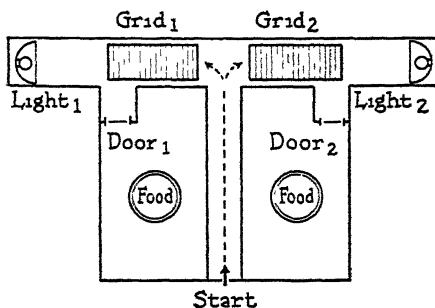


FIGURE 62. Learning curves for rats in the maze shown in Figure 61. Trials were run in pairs, and the errors for each pair were averaged. [From Tolman *et. al.*, p. 226.¹⁶]

the larger room? In carefully devised training procedures Tolman *forced* some of the rats to develop a discrimination of the turn-to- F_1 , starting them sometimes at S_2 and sometimes at S_1 , but reinforcing them in the feeding compartment on the right of the starting alley. Others were trained to find their food in the *same place in the room*, no matter where they started. The curves (Figure 62) indicate the greater speed of the place-learning group. All 8 of his place-learners reached the criterion (10 successive errorless runs) within the first 8 trials. Five of the 8 "response-learners" did not reach the criterion. In fact, in spite of the procedure that reinforced but 50 per cent of their trials this group of five stubbornly went to the *same place*. For these rats, in this training set-up, the cognitive map was a place map, a set of relations to the larger room. Tolman views such a disposition as "simpler and more primitive."¹⁶

Other experimental studies have demonstrated that it is the pattern or arrangement of stimuli rather than the physical properties of the isolated stimulus that is regulative of the learner's reactions; and as in the above study the claim is made that reactions to relations, to wholes, are the simpler, more primitive types of response. Certainly we can teach a child to pick the higher of two tones more easily than to select a particular narrow band of frequencies from a series. Similarly, in the discrimination box (see Figure 63) the animal can be taught to go to the brighter of two lights. And if we then test the trained animal, using a second pair of lights in which the formerly preferred (brighter) light is exposed with a *still brighter one*, we shall discover that the preference has shifted now to the brighter light not previously used in the training. The physical intensity of the preferred light (viewed as an isolated physical stimulus) is not an intensity previously reinforced; the relational factor governs the response. The two pairs can be so arranged that the actual stimulus that is avoided throughout the training will be the one that is approached in the test trials. The reaction to the specific stimulus is reversed while the reaction to the relationship remains constant.

FIGURE 63. A discrimination box. When the animal turns toward the brighter light, he finds the door open to food. When he turns toward the less-bright light, he receives a shock from the grid.



There are other training situations that will operate in different fashion. For example, rats may be trained to jump to a black card when it is exposed with a white one (a darker-than reaction). What will happen when two white cards are exposed? Two blacks? Investigating this situation Webb found that a “++” stimulus led to prompt jumping (2.0 seconds); “--” stimulus led to delays (80.5 seconds). The relationship was eliminated on the test trials, in this case.¹⁷

Psychological theory, at this point, seems to share some of the characteristics of the learning process itself. Discovering that their animals react to relations, to larger wholes, some have generalized, asserting that this is the fundamental process, that it is basic, more primitive. Others, finding animals capable of guiding their adjustments by sharply discriminated stimuli, have been inclined to build their learning theories upon specific responses to specific stimuli. Looking at the array of evidence one is inclined to believe that the degrees of abstraction, the selected aspects, the provisional tries are most varied in nature. Sensory capacities, native preferences, previously established sets, familiar categories, old modes of grasping, and the layout of the field itself, determine now one type of response, now another.

Some have seemed to argue that a reaction to the *whole* field is better, that insightful learning comes when the cognitive map is made to include all of the relationships. Certainly the strip map, where a narrow part of the field is reacted to, can lead to very stupid behavior. Consider Donald, the immature one, with his stereotyped swing-and-shove movement of the chair—a movement that does not get him under the cookie once relations are changed (see page 319). And certainly a mode of grasping the situation can be so persistent, so stubborn, so resistant, that a problem remains insoluble. The rats chose to go to the *place*, even though reinforced half of the time.

Much learning requires that we give up our preferred mode of response for another, or that we break up what has long been an integrated whole, dropping out elements and inserting new ones. Particularly in psychology

does the learner have to lay aside the clichés that have been built into our folk psychology. And in our interpersonal relations! "I knew a man, once . . ." seems to provide us with our "understanding" of so many we meet—this and the categories of age, sex, occupation, status, race, color. It is difficult to view the novel situation as really novel, as it really is. We grasp it by the familiar handles, we stop to observe only long enough to identify, classify, and produce the familiar recipe. Maslow suggests that this abstracting, classifying tendency is a measure of our laziness, of our anxieties, of our preoccupations with too pressing motivations. Perhaps it is a measure of our *ill* health, our degree of *maladaptation*. Habits are conservative agents, efficient ways of dealing with (and dismissing) situations too complex or too frightening for contemplative study; but they are by the same sign the forces that freeze the mind, stereotype our learning, block an insightful appreciation of the uniqueness of the present field.

Yet without the handle it is almost impossible to grasp the novel event. Maslow describes his own experience as he listened to some American Indian songs.

"The writer found during a summer's field work with an Indian tribe that he could not remember the Indian songs which he liked very much, however often he tried. It was possible to sing the song along with the Indian singer perhaps a dozen times, and then only five minutes later not be able to repeat it alone. For any person with a good musical memory this can be a baffling experience, understandable only when it is realized that Indian music is so different in basic organization and quality that there is no frame of reference against which to remember it."*

It would appear that we can scarcely escape the abstracting tendency. To a degree we can avoid its unhappy consequences by our awareness of what our cognitive maps are like, by the utilization of *multiple* abstractions, by the free play of the mind over every possible aspect and relation (when we are blocked), by the realization that our hypotheses are hypotheses, and by a return again and again to the event itself. Our ways of classifying the stimulus can operate so as to complicate our task; a category can obscure our vision. To alter a Spanish proverb quoted by Maslow. Recognized, the barriers are cobwebs, unrecognized, they are shutters of steel †

* A. H. Maslow, "Cognition of the Particular and the Generic," *Psychological Review*, 55 (1948), p. 32. Used by permission.

† "Habits are at first cobwebs, then cables." *Ibid.*, p. 29.

MANAGEMENT OF MOTIVATION IN PERCEPTIVE LEARNING

In simple conditioning the strength of the reinforcer seems to guarantee the rapid formation of CR's and to produce more persisting responses. Particularly in avoidance learning one traumatic experience can fixate the tendency "never to go near the place." In trial and error learning, particularly as the shape and pattern of the provisional trials become important, increasing the strength of motivation entails a risk: the over-anxious striver tends to fixate on his hypotheses, to develop a narrow and stereotyped approach. He runs out of ideas, and his cognitive maps are strip maps rather than flexible multiple-track approaches to a broad field.

Yet a positive approach to the problem must be maintained. To bring the learner along a course of persistent striving the problems should be graded in complexity and difficulty so that they can be insightfully solved, stage by stage. He must be kept informed of his results, aware of the nature of his errors. The ambitious teacher can be too ready with criticism of errors, particularly in the early stages before either confidence or understanding is established. Then the problem seems too difficult, the decisions too arbitrary, and learning passes from an active and purposive trying to a passive, blundering, spectator behavior. Particularly dangerous is the negative type of motivation, punishment for failure; for its generalization spreads to the training situation as a whole, blocking the productive try, the proffered hypothesis. Better than punishment is the arrangement of the task so that the inapplicability of hypotheses can be seen, the false "set" broken by the perceived relations rather than the arbitrary "Wrong!" Varied materials prevent the stereotyping of too narrow abstractions and serve to extinguish too generous generalizations; but the variations must be introduced at such a rate that the confidence of the learner is not destroyed. These recipes are easy to verbalize, difficult to execute with the living learner.

The conditions that produce an "experimental neurosis" block all learning, but they are particularly damaging to the perceptual type. They can be named in summary fashion at this point:

1. Pressing for too difficult discriminations, presenting problems of too great complexity.
2. Confining the learner in the harness, or its equivalent; restricting freedom of movement and choice.

3. Utilizing maximum strengths of motivation
4. Introducing competing and conflicting motives (punishment, approach-avoidance, and the like).

The insightful type of learning will be the first to go. Behavior will descend to a blundering trial and error, stereotypy will enter, and finally fixations will signalize that progress has stopped. Increasing motivation at this point will tend to solidify the fixation, and produce anxious or apathetic learners.

Directing the Learner

It is not the strength of the drive but its direction that is most important. The history of the development of motives in the individual is the history of a progressive sharpening and definition of goals. Even within the single learning experiment we can see the transition from fumbling to behavior with an end in view. Congo did not even recognize or utilize the stick at first, her first trials seemed utterly random; but there came a day when the stick was picked up on the way to the goal and utilized as a rake. Half of learning—and for perceptive learning the important half—consists in discovering precisely what one wants to do. If we adopt the Freudian term *Id* as a name for our original motivations, then we could agree with Jung that it is in the “psychification of the *Id*” that human progress consists, in the refinement of the cravings, in the adjustment of wants to the shape of reality, in the directing and patterning of motives. Mere drives produce conditioning, trial-and-error blundering. Directed trials transform the perceived relations, summon relevant experiences, produce rapidly descending learning curves.

The Relative Roles of Direction and Experience

A person may have all the materials of his problem before him and all of the requisite experiences that should tell him what-follows-what and yet fail, as a reasoner, because he takes the wrong direction, because he organizes the materials improperly. Maier performed an interesting experiment in which he gave his subjects the task of constructing a pendulum.¹⁸ The subjects were led, one at a time, into a low-ceilinged room where they were shown the materials for their construction (see Figure 64). They were instructed not to make use of the chair or to move the table. Their attention was directed to two chalk marks on the floor and their problem was defined as one of constructing two pendulums from the materials given, building their device so that each pendulum would make a mark on the floor as it swung over the points marked on the floor.

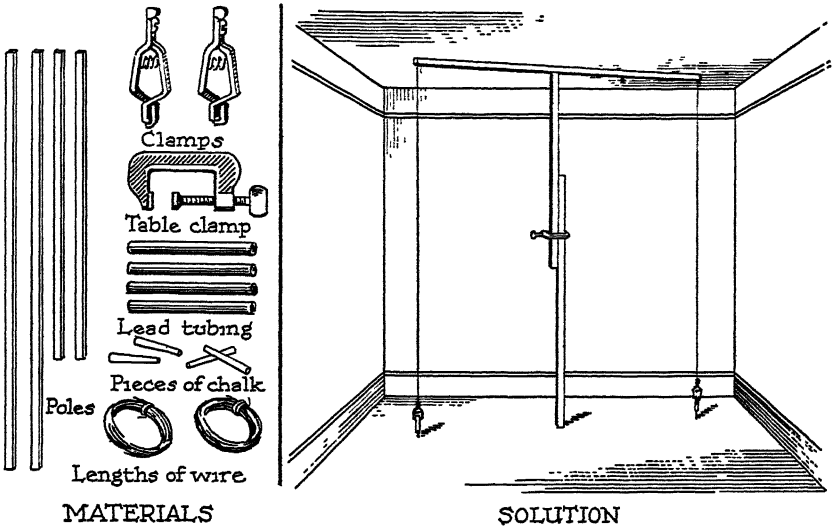


FIGURE 64. Pendulum problem—materials and solution.

In order to give each subject the same background of experience and to make sure that these experiences were recent enough so that there would be no question of faulty recall, three demonstrations were given. The subjects were shown how to make a long pole which would reach an object placed at a distance greater than the length of the longest single pole (by using the table clamp). They were shown how to make a plumb line (with burette clamp, pencil and wire). And they were shown how to do without hammer and nails. In this third demonstration a cloth was stretched across a doorway and held taut by a process of wedging sticks against the edges of the cloth. One of the sticks was placed against the side of the doorway and a second stick was wedged against it and the opposite wall of the doorway. By placing an edge of the cloth under the top of the “T” thus formed, and by repeating the process with the other edge, a taut screen was formed without the use of hammer and nails.

In spite of the presence of the requisite materials, and the fresh demonstrations of how to make the parts of the pendulum construction, 36 out of 37 of Maier’s subjects failed to accomplish the assigned task. One, beginning his thinking with the notion of using the table as a support, clamped a long pole to the tabletop. Finding this too wobbly a support for his pendulum his next task was to bolster this pole; but his materials ran out. Stuck in the rut of this direction the subject found the problem insoluble. Another tried to build up a “hatrack” support from the floor and also ran short of materials.

When Maier asked another group of comparable subjects to consider (in addition to these demonstrations) the possibility of hanging the pendulums from the ceiling, 8 out of 22 subjects produced the solution shown in Figure 64. With this orientation, the demonstration of how to do without hammer and nails became suddenly germane. Although the ceiling had been there for all the subjects, at least objectively, it did not become a lively and functional part of the thinking of his subjects until his suggestion enhanced it, until the new direction was taken.

In another experimental study Maier brought his subjects into a room containing tables, chairs, poles, ring stands, clamps, pliers, and extension cords. Two cords hanging from the ceiling to the floor were pointed out and the subjects were assigned the task of tying the two ends of the strings together. Holding one cord, the subject found that he could not reach the other. This presented the problem. Several solutions were possible. For example, one cord could be lengthened by tying on a bit of extension cord. Then Maier asked for an additional solution, pressing for more solutions until finally the subject used the pliers as a weight and set one of the cords swinging so that at the end of its course it could be grasped while the subject held the other cord. In case the subject failed to arrive at this desired solution Maier gave a series of "hints" which served to enhance the essential steps toward the solutions. For example, the experimenter, walking across the room, managed to set the cord in motion. Or, if this failed, the subject was handed the pair of pliers and told, "With the aid of this and no other object there is another way of solving the problem." Having allowed his subjects at least ten minutes before any hint was given, Maier found that in the case of 23 of his 61 subjects the solution was precipitated within an average lapse of time of 42 seconds. Twenty-four of the 61 subjects reached the solution without the precipitating hint, 14 failed even with hints.

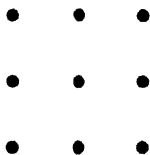


FIGURE 65. Nine-dot problem (For the solution, see the last page of this chapter.)

A similar illustration of the way in which a faulty definition of the problem, or a faulty direction, can block the appearance of a solution is offered by the following problem. The nine-dot figure shown in Figure 65 is presented to a subject, with these instructions: "Draw four straight lines which will pass through each of the dots of the figure. Once the lines are started the

pencil should not be lifted from the paper, and there should be no re-tracing." Without the explicit instruction most subjects nevertheless feel confined to the dot figure and do not go out into the surrounding field. So confined, by this self-imposed faulty direction, the problem is insoluble

The "stickiness" of such false directions was so outstanding in Maier's experiments that he performed one experiment in the hope of demonstrating what could be done to overcome it by direct exhortation. He gave a 20 minute lecture to half of a group of 384 subjects who worked on reasoning problems similar to those we have been describing; he stressed the importance of keeping out of the rut of habit, of keeping the mind open for a fresh line of attack, the importance of correct diagnoses of difficulty and the danger of blocks from false diagnoses. The scores of the lectured group increased to 49.2 per cent as against the score of 39.7 per cent for those who did not receive this advice. Such advice as "drop it for a while," "try a fresh line of attack," seems rather vague, and somewhat negative in character, yet it produced a measurable improvement in the performance of these subjects.

The teacher, watching a learner work at a task that can be solved insightfully, blundering within the boundaries set by his much too limited cognitive map, is impelled to say:

1. *Hold on a minute. Delay your responses a bit.* Don't rush in with your arms and legs before you have looked at what is actually there. Monkeys and children jump in. Perceptive learners survey the field, examine the parts, make provisional trials.

2. *Make your trials, but keep them provisional.* The more sharply you can define what you are about, the more you will learn from a trial. But remember that your view of the matter is merely one of a number of possible views. You will learn what *not* to do from your failures; but how profoundly you may have to alter your way of framing the problem will not be apparent. You may need to return to the original assumptions, re-examine the parts of the field, take an entirely fresh direction. Sometimes just "dropping it for a while" will permit inhibitory sets, false directions, to drift into the background while a fresh line of approach is made.

3. *Watch your stereotypes, your "strip maps."* These pliers are not mere pliers. Every part of the field is a wellspring of properties. Pliers become a weight-to-swing-a-cord-with, tongs-to-extend-the-arm, and so on. Much learning consists in breaking the bonds of the probable, the usual; and the teacher may assist the process, using emphasis, example, gestures.

In the progressive refinement of the trials the learner narrows his effort, directing and canalizing it toward the appropriate means-end relationships. When he learns precisely what he wants to do he has solved the problem, discovered its essence. Up to this point his successes are sporadic, uncertain, the reinforcements satisfying but somehow unclear. The precise statement of the problem and the skilled solution of it emerge together.

It is a curious fact that it should be so, but the evidence seems clear. We do not always know, in any clear form, what it is that we truly need, what it is that we desire. Solving our problems, as persons, involves us in this quest. Our responses at the perceptual-cognitive level are frequently full of what *they* say, of what prestige-suggestion (and men of distinction) seem to indicate as "the one thing necessary." Our need to belong, to conform, to appear to possess and enjoy what all the best people possess and enjoy, is so pressing that more significant (and perhaps more difficult to formulate) goals are by-passed, overlooked. We scarcely have the wit to discern such goals, the sense of personal security required to withstand the tide of conformity-pressures; and sometimes our own performance falls so far short and so wide of the mark such goals would set, that it is actually more comfortable to neglect them. We do not take the leisure to contemplate such a problem; we can scarcely tolerate the radical revision in our life-plans such reflection would require. The cobwebs of habit, of the pressing stream of stimuli, have become steel traps. Sometimes an illness, some catastrophe, enforces the leisure and the need to re-assess one's life; and what had bound us in the routine of stereotyped existence suddenly seems unimportant, and the catastrophe a blessing. One of the main tasks of the clinical psychologist is frequently that of helping another person to discover what it is that he really wants—so alienated do we become from ourselves.

THE MANAGEMENT OF THE FIELD

The third group of factors determining the efficacy of learning and recall lie in the arrangement of the field that confronts the learner. In its shape, in the temporal and spatial grouping of its features, there are dynamic factors which affect what the learner can see, how he organizes his attack upon the problem, what he can preserve and carry away from it. In the chapters immediately following we shall turn to these features. We have had a foretaste of their power, for example, in Maslow's inability to organize and retain the unfamiliar music, and in the inability of the ape to solve the stick-banana problem when the stick was a part of the bush-configuration.

In both of these instances, however, the ordering of the field seems to depend upon the force of previously learned integrations. Before we leave our description of the perceptual field we shall examine the Gestaltist's claim that there is an organizational factor that operates *de novo*, prior to experience, a true Gestalt-force.

REFERENCES

1. E. R. Guthrie, *The Psychology of Learning* (Harper & Brothers, 1935), p. 26
2. G. V. Hamilton, "A study of Perseverance Reactions in Primates and Rodents," *Behavior Monographs*, 3, No. 2 (1916), pp. 1-65.
3. W. N. Kellogg and L. A. Kellogg, *The Ape and the Child* (McGraw-Hill Book Company, Inc., 1933).
4. Wolfgang Kohler, *The Mentality of Apes*, translated by Ella Winter (Harcourt, Brace & Co., Inc., 1926).
5. R. M. Yerkes, "Modes of Behavioral Adaptation in the Chimpanzee to Multiple-Choice Problems," *Comparative Psychology Monographs*, 10, No. 1, Ser. No. 47 (1934), pp. 1-108.
6. Kurt Koffka, *The Growth of the Mind*, translated by R. M. Ogden (Harcourt, Brace & Co., Inc., 1925), p. 233.
Ruger's study is reported in H. A. Ruger, "The Psychology of Efficiency," *Archives of Psychology*, 2 (1910).
7. C. T. Morgan, *Physiological Psychology* (McGraw-Hill Book Company, Inc., 1943), Chap. XXIII.
8. E. C. Tolman and C. H. Honzik, "Degrees of Hunger, Reward and Non-Reward, and Maze Learning in Rats," *University of California Publications in Psychology*, 4 (1930), pp. 241-256
9. E. C. Tolman, "There is More than One Kind of Learning," *Psychological Review*, 56 (1949), pp. 144-155.
10. ———, "Cognitive Maps in Rats and Men," *Psychological Review*, 55 (1948), pp. 189-208
10. R. M. Yerkes, *Chimpanzees* (Yale University Press, 1943), p. 187
11. Abraham S. Luchins, "Mechanization in Problem Solving," *Psychological Monographs*, 54, No. 6, Whole No. 248 (1942), pp. 1-95
12. William James, *Psychology, Briefer Course* (Henry Holt & Co., Inc., 1892, 1915), Chapter X
13. Hilgard's term. For an excellent discussion of this problem, see E. R. Hilgard, *Theories of Learning* (Appleton-Century-Crofts, Inc., 1948)
14. B. F. Skinner, "'Superstition' in the Pigeon," *Journal of Experimental Psychology*, 38 (1948), pp. 168-172.
15. W. N. Kellogg, "'Superstitious' Behavior in Animals," *Psychological Review*, 56 (1949), pp. 172-175
16. E. C. Tolman; B. F. Ritchie; and D. Kalish, "Studies in Spatial Learning. II. Place Learning vs. Response Learning," *Journal of Experimental Psychology*, 36 (1946), pp. 221-229.
17. Wilse B. Webb, "A Test of 'Relational' vs. 'Specific Stimulus' Learning in Discrimination Problems," *Journal of Comparative and Physiological Psychology*, 43 (1950), pp. 70-72

18. N R F Maier, "Reasoning in Humans I On Direction," *Journal of Comparative Psychology*, 10 (1930), pp. 115-144

——, "An Aspect of Human Reasoning," *British Journal of Psychology*, 24 (1933), pp. 144-155.

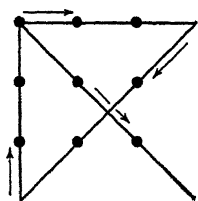


FIGURE 66. Solution to the nine-dot problem (Figure 65, page 350).

PART FIVE

Attending and Perceiving

CHAPTER 11. Attending and Perceiving: Social Aspects

CHAPTER 12. The Perceiver and His Needs

CHAPTER 13. The Influence of a Preparatory Set

CHAPTER 14. Localizing Objects in a Field

CHAPTER 15. Organizing, Retaining, Recalling: A Configurational Approach

CHAPTER 11

Attending and Perceiving: Social Aspects

Now that we have surveyed the types of learning and have achieved some understanding of the principal factors that regulate the course of learning, it will be interesting to observe the process at work in the world outside the laboratory. Human growth and development occur in a culture, within classes and castes, within a family. Completely dependent upon those who surround us in our infancy, we have to make our way into a structured world of interpersonal relations.

As we develop within this structured world we learn to isolate and pay attention to significant objects, relations, persons; and as we relate ourselves to a scheme of things, we acquire a world outlook, a sense of our own past, an orientation toward the future, a sense of who we are. In short, we learn how to perceive the world. It is our purpose, in this chapter, to observe (1) how the culture shapes such perceptions, and (2) how these perceptions in turn provide the framework within which further learning goes on. Here we can see the processes of reinforcement and extinction operating within the social scene. And we can observe the development of fixations powerful enough to prevent human learners from profiting from further experience, from seeing clearly the reality that passes before their eyes.

Only by facing the overwhelming power of the social matrix to shape our views, only by discovering how the interpersonal forces create the concealed premises for our later perceiving and thinking—almost before we become conscious—can we ever hope to transcend our present condition. The issues

that require such an understanding are today as significant as human destiny itself; and many of the current realities we are trying to perceive are shrouded by a stereotypy of which we are scarcely aware. In this chapter we can at least state the problem.

Child and Adult

If we compare the behavior of the child and adult, among the many striking differences that meet the eye are those that have been traditionally described as aspects of the attention-process. The child's attention wanders, and his interests are of brief duration, whereas the adult has a greater power of maintaining prolonged concentration upon a task. There is also a difference in the kinds of objects that catch and hold the attention of these two age-levels. The physical properties of the stimulus object seem to be of prime importance in the case of the child, the bright color, the loud sound, the rapidly moving or changing stimulus capture his attention, whereas the form and meaning of the object, its role in a larger setting, and its relation to long-term plans and purposes seem more important factors in the adult.

In the course of development, the control of behavior seems to pass from the immediate and local physical stimulus to a wider setting, from the physical properties of the immediately presented object to the subjective sets, plans, purposes of the perceiver.

The Dynamic Character of Our Perceptions

As this development proceeds it becomes more and more apparent that the individual's perceptions of the world about him are not a simple passive registering and recording of impressions. As he sees and hears, he also *organizes* and *selects*. In the act of grasping and isolating some events he neglects others. Because of his own needs he places a unique construction upon the world at the very moment he experiences it. Indeed, at times when their stress is too great—and when they are imperfectly understood—there is a distortion of the perceived field that is so great that we speak of delusions.

But the perceiver is also prone to see the present scene as just another case of some oft-recurring event, classifying even that which is novel under the old familiar categories, generalizing upon the basis of his limited experience, shrouding novelty in the mantle of the familiar.

The interplay between these two processes (the generalizing from the past and the organizing of the field in terms of present needs) occurs within an individual with a somewhat unique life history, with his own life style, and with a hierarchy of motivations that are changing from moment to

moment As he moves through the perceptual field he *creates* it, and to the degree that these projective and organizing forces within him are unique the world that he meets will be like the world of no other person Many of the problems he meets will be of his own creation, therefore; and some that appear insoluble would prove less difficult if some change in the organization of the forces within him could bring about a new order in the perceived world

Although this analysis seems to give some justification to the poet's lament that we are lonely souls, quite isolated,* and to give some support to the dictum that "on life's highway we meet ourselves," there is both a community of shared experience and a common biological heritage (which guarantees similar needs) so that communication and understanding are possible In fact, when we examine the operation of the culture upon the developing perceptions of the individual, we are appalled by the *lack* of originality, individuality, and by the very inability of the individual to transcend this common experience.

CULTURAL DEFINITIONS OF REALITY

As we read the accounts of the anthropologist's studies, particularly those that reveal the ways in which more primitive peoples perceive the world about them, we get a sense of the power of a tribal view of life. There is an absoluteness about it. And to the tribesman it seems to have existed from time immemorial, if indeed he has ever reached the point of considering it as a view of things More commonly, he is sure that the world just *is* that way No one *invented* his view No rational person would think of the world in any other terms Or, if the tribe perchance remembers some Promethean light-bringer, honored as the discoverer of the tribal view, this Prometheus is not regarded as a tinkerer, an inventor, a fashioner of world views, but as the *discoverer*, the messenger of the gods, as the one who revealed the *true* shape and form of reality.

Even in the manner in which we hold our own views there is more than a touch of this absoluteness. The superior vantage point in history from which we look down upon the gulf between the erroneous and superstitious perceptions of primitive peoples and the reality that surrounds them, does not always provide us with an equally keen awareness of the fact that by "reality" we refer to *our* tribal views

* See Matthew Arnold's "To Marguerite."

The Village of Chan Kom

Consider some of the beliefs men live by in the village of Chan Kom, situated in the hinterland of Yucatan. Here Robert Redfield has studied the descendants of the ancient Aztecs now living under a system of beliefs that contains a mixture of ancient Indian myths and Spanish Catholicism. Among their beliefs, unshaken by their limited contacts with western civilization, is the firm conviction that disease and all manner of evil come from the winds that sweep their village. They are as terrified at the approach of a dust eddy as we would be at the sight of a coiled rattlesnake, and they act upon these perceptions and beliefs. Their behavior is appropriate to this "cognitive map." The workman coming in from the field is not permitted to pick up his child until he has rid himself of these evil and infectious influences. The young couple, looking about for a site for their home, avoid the valley where the evil winds moving between the hills can be felt. Children, the villagers assert, are more susceptible to illnesses simply because age and discretion have not taught them to avoid what is dangerous; and an anxious mother in Chan Kom is as concerned about exposure to these winds as some of our ancestors were about exposure to the night air. When illness falls upon the villager, the shaman—or native medicine man—is called in, and the entire household participates in the ritual of banishing the evil influences of the disease-bearing wind. The relief the family feel as they watch him perform the ritual resembles that which we experience as we watch the entrance of our physician into the sickroom and observe him as he begins the pulse-recording, temperature-taking rituals in his best bedside manner.

Redfield recounts a tale one of the villagers reported to him, and the sobriety and certainty with which the latter spoke indicate the depth of these convictions. Six villagers, seated before a roadside hut, espied a dust-eddy approaching. All but one promptly darted indoors, terrified by this menace. The one, a bold fellow (who had been down to the seaport of Merida too often, and whose views, no doubt, had been corrupted by contact with white men) wished to show his contempt for what he had come to regard as an ignorant village superstition; and he approached the dust eddy, swinging his sombrero as though to catch it. But not with impunity! "That night," the informant reported, "he began to have pains in his chest, and the next night he was dead."¹ Compounded of such tales, the tribal memory provides many edifying instances to warn any youth who might be skeptical of the danger of departing from the tribal customs.

The Persistence of False Perceptions

The outlandish and unreal character of the perceptions we have selected for illustrative purposes raises questions about the nature of their support. Had we taken more common examples the nature of the reinforcement would have been taken for granted. The warnings parents give their children about real dangers (crossing the street, eating green apples, petting strange dogs, speaking disrespectfully to adults) receive a certain amount of reinforcement from nature. The geographic environment supports the warnings of the elders. But what about the warnings about spirits, evil winds, and other supernatural forces and beings? Why should such beliefs persist, even among the elders?

Chance is often invoked to explain their persistence. Whiting describes such an occurrence among the Kwoma.² These tribesmen of New Guinea have very deeply entrenched beliefs about supernatural monsters, called *marsalai*, which dwell among their swamps. Compared to crocodiles or huge snakes, these spirit beings seem to be involved in all the important rituals and to threaten every departure from the accepted norms of Kwoma life. The natives believe that if they disturb the dwellings of these beings, retaliation inevitably follows. They dare not stir the waters of the swamp, or build a house too near, or cultivate a nearby field. One youth, who had cleared a garden site near one of the supposed homes of the *marsalai* expressed anxiety about this; but the site was too valuable to abandon and he continued his clearing. When, at nightfall, one of the frequent storms arose, he took the warning as a clear indication that he had transgressed, and when the anthropologist called his attention to other storms which had arisen when no such offense had been given, he promptly replied that someone else from a neighboring village had undoubtedly done so. Here we see the inertia of belief: a *possible* validating fact is imagined before the negative instance is accepted and allowed to work its full extinction effect.

This clinging to the doubtful hypothesis while searching for evidence to justify a belief reminds us of the competition between the processes of extinction and generalization when a simple discrimination is taught to a laboratory animal in the conditioning experiment. The spread of the power of the conditioned (reinforced) stimulus to adjacent members of the stimulus-dimension (other tones in addition to the frequency actually used) is only slowly checked by the non-reinforcement of all other frequencies; and this extinction of the responses to adjacent stimuli in turn weakens the CR to the reinforced cue, inducing in the experimental animal the behavioral equivalent of the doubt that arises in the human perceiver. In the human per-

ceiver there is something more. He acts as though he had an investment in his beliefs and a feeling of guilt when the tribal taboo is transgressed. He has learned to live by them, and they are an integral part of his security-system. Whatever challenges them can be a source of anxiety. They *must* be true! And, conversely, whatever increases our anxiety seems to intensify the rigidity of our beliefs.

The theory of chance coincidences does not seem to be enough. There are chance failures, too; and if it were not for the fact that warnings about the *marsalai* were intermingled with more realistic warnings which were always reinforced, they would soon be sloughed off. The children are warned about real snakes, about genuinely poisonous foods, wild pigs, crocodiles. And the *marsalai* are invoked to support the elders when they try to teach the tribal ways. They are, in fact, merely a part of the total punishing technique used by the elders who insist upon conformity to the tribal ways. And although the *marsalai* are unreal, the anger of the elders which is visited upon an offender is very real. Thus the borderline between the real and the supernatural is obscured; and the generalizations based upon the reinforcements that follow the infringement of legitimate warnings spread their coercive mantle over the supernatural beliefs. And because the *marsalai* are invoked at the yam planting, at the funeral, at the ceremony when adolescents become men, at dances, in head-hunting, in ceremonially sanctioned times of sexual licence, in every accident and natural disaster, in illness, because—in short—the beliefs are embedded within all the important institutions of the culture, the local exceptions which seem to us enough to disprove the rule are daily counterbalanced. They are resisted with the force of the culture, and their stability is the stability of a way of life. A poor theory of life is maintained—by life itself; and perhaps we should grant that the tribal ways have, in their favor, a sufficient degree of rightness. At any rate the yams do grow, and the youth (who undergoes the ritual bleeding *and* makes the proper placation of the *marsalai*) does become a man. And because life does go on more or less “as expected” the attendant framework of beliefs and modes of perceiving receives sufficient reinforcement to carry it forward. And the believing elders, concerned for the welfare of their children, see to it that it is carried forward.

In the laboratory experiment we observe that the learner’s hypothesis tends to canalize the effect of reinforcement. In the life of the tribe we observe that these hypotheses themselves receive reinforcement; they are revitalized, energized, by their transmitters. The bearer of a belief is like a booster relay in a communication system, giving the fading energies of a message new intensity for the next segment of the system. To the view of the world that

he transmits to young learners he adds an intensity arising out of his own energy-system, an intensity that expresses his own anxieties and doubts (or from somewhat irrelevant personal needs, the desire for power, the wish to impress others, and so on). And in the quality of his voice (in telling about the *marsalai*) in his threatening gestures, there are emotion-inducing cues which—although they have no “logical right” to do so—serve as reinforcers of his message. Sympathetically, his hearers “thob” with him.*

And we should remember, too, that the transmitters are the punishers. Whiting writes:

“Kar, Mar, Gwiyap, and I were walking through the swamp one day, and the path passed by a waterhole. Kar warned the rest of us not to pass too near to it for it was the dwelling place of a *marsalai*. Mar and Gwiyap heeded and passed by the waterhole at a distance. I, however, did not heed, approached the hole, and poked my walking stick into it. The three Kwoma shouted at me for doing this, warning me to stop and scolding me for my temerity.”†

And in another case:

“. . . a youth who had not yet received his keloids of manhood, attended a funeral ceremony, thus ignoring the warning about the danger from the *marsalai* of the cult to those who are not yet initiated. Munkik was attacked and beaten by the members of the cult, and after being tied hand and foot, was thrown into a near-by dwelling. Had it not been for our presence he might have been killed.”‡

Thus the transmitters, stepping up the intensity of their errors, give to them the ultimate sanction, since they hold the power of life and death in their hands. They are, of course, convinced of the righteousness of their action. So, too, the Inquisitors—feeling themselves responsible for the immortal souls of their charges—could not spare them pain.

Only when a stronger alien culture has overwhelmed the tribe and threatened the material basis of existence, only when doubt assails the elders, when the transmitters of a culture no longer are able to “step up” the charge and reinforce the beliefs which they teach, does the extinction-process really set

* The word “thob” was coined by C. Henshaw Ward to indicate thinking with a strong emotional component. See his book, *Thobbing* (Bobbs-Merrill, 1926).

† John W. M. Whiting, *Becoming a Kwoma* (Yale University Press, 1941), p. 206. Used by permission.

‡ *Ibid.*, p. 213.

in. The alien "magic" now looks more powerful even to the elders. Their warnings lose potency, non-conformers enjoy immunity, a system of beliefs and a way of life collapse together.

We might define a culture, with its interlocking institutions and beliefs, with its living agents who are its carriers and transmitters (and in one sense the age of a culture is the age of the oldest inhabitant) as a device for perpetuating error. It does that, among other things. It is also a way of life, a system of child training, an interlocking set of economic relations and of "powers" which control access to and the distribution of the basic necessities of life. And it is a systematic device for restricting deviations. Growing up within this frame the individual acquires perceptions, beliefs, values, that are certainly not of his own invention. We can see much humbler mechanisms at work than any we should want to call reasoning or creative imagination.

Perhaps the most striking aspect of our illustrations is the wide margin of error that can be carried as a kind of cultural overhead charge upon a way of life that works, even if only after a fashion.

Geographic Space and Life Space

An instance from the Balinese culture provides still another demonstration of the way in which a culture structures and organizes the world for its members.³ A "sacred" significance is added to the spatial relations of their island home. East is somehow higher, the west lower; and inland is also higher, coastalward lower, on the scale of values. They lay out their house-yards, carefully respecting these relations: the family shrines are located on the inland or eastward side, the kitchen and the latrine are toward the coast or the west. They sleep with their heads to the east, or to the inland side, and the superior one of the household sleeps to the eastward (or on the inland side) of the inferior ones. A high-caste person entering a room looks about for the higher chair, or at least for the one with a quarter-inch mat upon it. In their rituals the offering to the gods is placed above other food. Instead of the right and left sides of his body the Balinese child learns an orientation to these sacred directions of the island, and he will tell the stranger that he has a fly on the "west" side of his face. The sacred directions are constantly with him, and so completely internalized and automatic that they operate almost unconsciously.

Early and late the Balinese show a concern about these directions. They are the outward signs of caste and every social occasion is an opportunity for reinforcement. The seating at the public feast must be so arranged that the head men of the village are at the inland-east side. The neck of the chicken is reserved for the special official who is entitled to it. The solemn

and humorless (and frequently embarrassing) rituals which involve space, caste, and the sacred, seem to the foreigner to be unnecessarily restrictive, even frustrating; but to the well-conditioned Balinese they are supporting, reassuring, tension-reducing. Thrust into a chair above his superior he is tense and ill at ease, almost dizzy with anxiety until he has reassumed a proper level. Bateson and Mead speak of the vendor woman who became ill when she found that she had raised her umbrella too high in front of the village temple. A similar illness (and a tendency to deep sleep) overcame the Balinese who was driven away from his village in a motor car so rapidly that he lost his bearings. His disorientation to these sacred directions was as painful to him as that which overcomes us when our semicircular canals have been affected by the pitching motion of a ship.

Just how early the responsiveness to these directions appears is indicated in the observation that “. . . . a child of eighteen months will shriek with rage if another is held over his head”⁴. It is odd to discover that such basic emotions as those of sibling rivalry can be woven into the fabric of spatial relations, and that love and hate and envy become bound up with geometry.

The Negative Side of Cultural Determination

In our intercultural contacts we also become keenly aware of many deficits in the perceptive powers of the members of other cultures. There are tendencies to gloss over differences that we consider important, to remain indifferent to signs that alarm us; and we often attribute to these other ones a dullness, a lack of sensitivity and intelligence. Americans, who are so highly conscious of disease-producing conditions, are amazed at the indifference that they find in the village in India. One visitor to a backward village observes:

“The villagers do not know that dust and flies carry disease. They do not know the connection between stagnant water and mosquitoes and malaria. They do not understand that trachoma is infectious. They have no idea that a leper is of any danger to the community. They do not associate polluted wells or streams with cholera or typhoid. They are ignorant that their ways of disposing of human waste spreads the hookworm from which 80 per cent of them are suffering”*

What the tribe does not isolate and define tends to be glossed over by the individual. The physical event just does not stimulate them as it does us.

* Gertrude Emerson, *Voiceless India* (The John Day Company, Inc., 1944), p. 73. Used by permission.

The Hindu family that is easily upset by any infraction of caste rules, and particularly by anything deviating from a *ritualistic* cleanliness, will at the same time employ as cook a woman who is ill with leprosy. And the upper caste Hindu will, in turn, observe the westerner's blindness of caste laws, his indifference to the things that are (for him) *truly important*.

When we speak, therefore, of the mind of the perceiver, locating it—as in our common practice and belief—in the cranium of an individual organism, we need continually to remind ourselves that its powers of organizing and of grasping the world about it are in a large measure socially derived, and socially conditioned. Which objects are seen, which neglected, what they mean and how they are valued, seem to depend to a large degree upon the social contexts within which this mind develops.

When the Balinese mother shouts “Aroh!” as her creeping child crawls near danger, vividly mimicking fear, she illustrates—in its most primitive form—the way in which the transmitters of culture verbally push and pull the responses of young perceivers until finally the phenomenal world of the latter corresponds to the perceived world of their elders. With physical punishment, with ritual, with folk tales, with dances, tableaux, and every art form, the tribal life pours down its influences upon the developing participants. So the Kwoma comes to live in the presence of the *marsalai*, so the Marquesans fear their *fanauna*, so the Balinese come to respect a sacred spatial order, and devout Christians come to walk in the constant presence of a host of unseen witnesses. Psychological analysis cannot be divorced from social analysis, nor can we understand the essence of believing and perceiving without a sense of the role of these transmission agencies.

SUB-CULTURES PRODUCE CHARACTERISTIC MODES OF PERCEIVING

There are important differences within the borders of our own broad cultural area, so pronounced that we might speak of sub-cultures; and each of the latter breeds its characteristic outlook upon life. The American melting pot, created by the successive waves of immigration from Europe and by the conquest or enslavement of Negro, Indian, and border Mexican, has not amalgamated all of these human materials into a homogeneous American type. Instead there has arisen a complex hierarchy of caste and class with widely differentiated roles and statuses, with “islands” of stagnant backwoods culture (and perhaps one should add Back-Bay culture) contrasting sharply with the newer, rapidly changing metropolitan areas.

And again we find that the mental processes of the individual tend to take on the local coloring of the face-to-face groups, to assume a form that is determined by the role he achieves in the complex social structure that surrounds him. Taking on this local coloring, the outlook of the individual is found to be surprisingly predictable when the most common responses of his in-group are known. Thus we find that there are Negro attitudes and attitudes of southern whites, C I O. attitudes and company-union views, upper-class and lower-class attitudes. . . . Those who conduct opinion polls in the attempt to predict the course of political or economic events find that their sampling of the population has to be planned so that each significant grouping within the culture is represented. It should follow, with respect to any individual, that the more we know about his total pattern of affiliation the more accurately we can plot the pattern of trends in his thinking and perceiving.

Classes and Class-Attitudes

That social classes exist in America is scarcely news, nor was it, even, when Karl Marx announced that the history of all hitherto existing society is the history of class struggles. Americans, though behaving and thinking class-wise, often deny the relevance of a class-analysis; or, admitting it in some vague form, show by their statements a tendency to overlook or reject the social facts. When the Institute of Public Opinion asked, "To what social class in this country do you think you belong, the middle class, the upper, or the lower?" 88 per cent of their respondents answered with "middle class." The remaining 12 per cent divided themselves equally between upper and lower classes.⁵

When, however, Lloyd Warner and his associates studied the actual speech and behavior of the inhabitants of an eastern seaboard community of some 17,000 population, they found that by their own words and acts the citizens of this community could be classified into some six classes, and that the percentage distribution of the membership did not at all conform with the way Americans seem to think of themselves when directly questioned about social classes. Figure 67 shows the class composition of "Yankee City" as derived from the actual clique associations and from evaluations that appeared in conversations. Less than 40 per cent were located within the middle class. Whereas on the Gallup survey 88 per cent of the respondents seemed to be looking at the world from this one class position, in "Yankee City" their everyday speech indicated something else. They referred to their fellow citizens in certain characteristic ways; for example, note the following remarks:

"I'm not in their class . . .

"They are the big shots in this town . . .

"They are not very well educated people; we don't have much to do with them . . .

"I would rather not have my daughter go around with that group . . .

"All the people on this street are a nice class of people . . .

"I don't see much of her any more now that she has decided to go around with the smart set . . .

"They are good, plain, people, but nobodies . . .

"They live like animals . . ."*

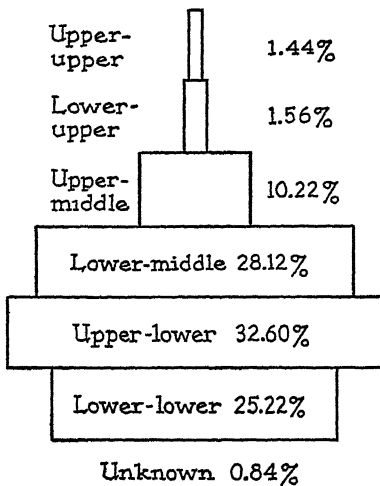


FIGURE 67. The class-structure of Yankee City [From Warner and Lunt, *The Social Life of a Modern Community* (Yale University Press, 1941), p. 88.]

And by the guest-list at the bridge party, the lodge membership, the church affiliation, but most clearly by the acts of dining together and by intermarriage, they revealed that there was actually a keener awareness of the facts of class structuring than they were always willing to admit. Both the ideologies of democracy and Christianity, which are widely held in all American communities, point in the direction of a political and spiritual equality; but the behavioral facts testify to a definite class structuring.

The Upper-Uppers Described

Who were these people who constituted the aristocracy of Yankee City? Examined as a biological group, 39 per cent were found to be adults of sixty years or more, 60 per cent were women, and there were but 11 per

* W. Lloyd Warner and Paul S. Lunt, *The Social Life of a Modern Community*, Yankee City Series, Vol. I (Yale University Press, 1941), pp 81-91. Used by permission.

cent under twenty-one years. All were native-born whites of long residence in the community, and their family histories indicated a long period of upper-class social participation. Marriage records showed a tendency to late marriage (the median age of those getting licenses was 28); and there were more spinsters, bachelors, and widowed individuals than in any other class, 40 per cent being single.*

Over 83 per cent found their occupations in the professions and higher managerial ranges, and there were no skilled or unskilled workmen among them. Neither were there wholesalers or retailers. A few are connected with industries in an owning or a managerial capacity. Although the study was performed during the depression, 90 per cent of those who were employable were at work. There were a few upper-uppers who were actually penniless, but these were cared for by other members of their families. The upper-uppers owned their own homes, and the latter were spacious and in good condition, located in areas that the citizens of Yankee City call desirable.

In their social participation they belong to social clubs, and to charitable organizations, but not to the lodges and secret societies. They go to two churches (in New England), the Unitarian and the Episcopal. Their children go to special preparatory schools, rather than to the local high school, and they are trained in college preparatory studies rather than in commercial and technical subjects.

A smaller proportion of this class use the public library than of any other class; but this is because their own home libraries are well-stocked. They subscribe to the conservative *Boston Herald*, described as having a good financial section, or to the *Transcript*, described as specializing in British news, genealogies, and upper-class hobbies. When the members of this class read for pleasure it is most often in the fields of biography, history, science, and in detective fiction; but they do not display any interest in novels that dramatize social success, the "work and win" type of success story. They do not subscribe to radical periodicals, nor are they interested in books on social reform. On their library tables the investigators found *The National Geographic*, *The Saturday Evening Post*, *Time*, *The Atlantic*, *Fortune*, *Sports Afield*, *Harper's*, *The New Yorker*, *Current History*, *Field and Stream*. In the light of their analysis of the biological composition of the class it is not surprising to learn that *Parent's Magazine* was seldom listed. Nor are we surprised—though for other reasons—not to find *The Nation* listed.

* Other populations studies have shown the fact that the upper ranges of the socio-economic system are not biologically self-sustaining. Thus Kiser points out that where family incomes are over \$3000 there are only 42 per cent of the children needed to maintain the population. This index rises to 96 per cent when families with incomes below \$1000 are studied.⁶

When the investigators analyzed the total number of arrests in the community they found that the upper-uppers furnished less than one half of one per cent of the total, and of the members of this class who were interviewed slightly more than one per cent had ever been arrested. (This is to be compared with the fact that 65 per cent of all arrests occurred in the lower-lower group; 11 per cent of the lower-lowers had ever been arrested) None of those arrested in the upper-upper class was under twenty-one years of age; while in the lower-lowers 30 per cent were juveniles.*

The Lower-Lowers

Viewing the lower-lower class biologically, the investigators found it to be composed of a majority of males (53 per cent); 28 per cent of its members were less than 21 years of age; and there were few old people and few spinsters Only 45 per cent were of native-born, white, New England stock, the balance containing Negroes, Poles, Russians, Greeks, French Canadians, Italians, Armenians, Irish, and Jews.

The members of this class marry early, over a third before they are twenty-one; and at an early age they enter the semi-skilled and unskilled occupations, working in factories and at clamming This class also experiences the greatest distress in times of great unemployment; and at the time of the study one in three was on relief Of all funds devoted to relief during the depression years 65 per cent was devoted to the assistance of this class Very few lower-lowers own their own homes (less than 6 per cent) and their dwellings are of little economic value, being small, run-down, and located in what Yankee City regards as its least desirable section

The lower-lower occasionally joins a fraternal organization; but he seldom belongs to more than one. The charitable, social, and economic associations (other than unions) do not list him Nor is he found in the Episcopal or Unitarian churches attended by his fellow citizens of the upper-upper class In Yankee City the lower-lowers who do attend church are found in the Methodist, Baptist, or Catholic churches, and in one of the Congregational churches

Less than half of the lower-lower children complete high school. Most of

* Warner and his associates point out that this does not prove that there is less delinquent or criminal behavior in the upper-upper group, it may mean that membership in an upper-upper family provides better protection from the normal operation of police-court procedures. Instead of booking an upper-class adolescent apprehended in some violation of the ordinances the police officer is apt to take him directly to his home. The completeness with which the upper-upper home assumes responsibility for its offspring is evidenced by the fact that none of the children handled by the Society for the Prevention of Cruelty to Children ever came from the two upper classes.

those who continue to this level choose the commercial and technical subjects. The superintendent of schools is quoted as telling his interviewer. "I always advise them to take the commercial and stay out of the Latin and scientific courses in high school. That means that they learn a little something useful. I see no use in people like that taking courses that would prepare them for college. Too many people are going to college anyway."* And when his visitor asked, "Are any of them bright?", he answered, "Yes, some are. But they don't last long. They soon peter out."†

Few lower-lower children use the library, their elders scarcely at all. History, biography, scientific books, are not in demand in this social stratum; and, as might be expected, there are few magazine subscribers. A Hearst newspaper is preferred to the ones read by the upper-uppers.

As was indicated above, many lower-lowers have fallen afoul of the law (11 per cent have been arrested and 65 per cent of all of those arrested in Yankee City come from this stratum). Since they comprise but 25 per cent of the population they can be charged with furnishing more than their share of the law-enforcement problem.

A Note on the Economic Factor

When Warner and his associates planned their study of Yankee City they assumed that economic and occupational differences were the basic factors determining class position. They soon discovered, however, that some upper-uppers lived on a very slender income (or were actually dependent), and that some clammers (lower-lowers) earned incomes that ran into five figures. But the genteel poor somehow "belonged," knew the right people, knew how to live, and were uniformly referred to as members of the best society; whereas the prosperous clammers were looked down upon by everyone save their own immediate class-members. Even within an occupational group, for example among physicians, the members might be distributed over three or four classes, and the distinctions among them could not be correlated with professional competence or income.

The attribution of social status appears, therefore, to be a kind of synthetic judgment depending upon a combination of factors: of clique associations, education, economic status, family membership, club and church membership. It appears to depend most of all upon family, upon being known and accepted by "the right people," and upon knowing how to act. Most of the upper-uppers were "old family" and could speak of parents and grandparents who also belonged to the same upper status. Although it was true

* Warner and Lunt, *Op cit*, p. 182. Used by permission.

† *Ibid.*

that, when the lines were traced back far enough, ancestors often appeared in the lower social statuses, these humbler forbears were so far removed from the memory of living Yankee City upper-uppers that embarrassing references to them seldom occurred.

The Upper Class Looks at the Lower

In Yankee City the upper-uppers made accurate and consistent discriminations between those who held adjacent social statuses; but they were very vague about the most distant classes. The differences between the upper-lowers and lower-lowers tended to be obscured in their thinking. The former, poor but proud, were actually much more stable citizens than the latter, by all social criteria. To the upper-uppers, however, both belonged to a social *terra incognita*, a vaguely defined lower class, a working class, a lower element. The low-status citizens were referred to by the two classes above them (the middle and upper classes, constituting roughly the upper 40 per cent) as riffraff, as people of low moral standards, as a group in which perversions and incestuous relations were common, along with all manner of sexual licence. They were regarded as shiftless, undependable, unintelligent, and generally inferior biological specimens of humanity. They were looked upon as a problem, a burden, and as the major source of our social difficulties. The burdens of relief, of labor troubles, were traced to them, particularly to those of foreign birth, and to those of different racial origin. The upper-uppers share the views of the Yankee City school superintendent quoted earlier. In answering the social worker who asked, "Why do people have to be so filthy?" he had replied:

"Because that's the way they like it Keep them all clean for six months and it would kill them They cause me more trouble than all the rest of the kids put together They're dumb and not interested They don't want to learn anything But what can you expect when their parents don't want them to either?"*

The Lower-Lower Looks at the Upper-Upper

The lower-lower is just as vague and indiscriminating in his appraisal of those at the distant upper end of the social scale The "new silver people" may not go around with the right set, and they may remain unknown to the members of the Yankee City Historical Society, or to the Albrights whose great-grandfather launched the Yankee clippers of an earlier day, but the Riverbrooker is indifferent to these distinctions which are on the lips of the

* Warner and Lunt, *Op. cit* , p. 182. Used by permission

upper-uppers. They are all alike to him, these high-mucky-mucks, these bloated capitalists, these greedy and selfish rich people. He looks upon the carryings-on of the young bloods with a mixture of envy and distaste, sometimes asserting that such behavior is evidence of the decadent state of the upper classes. The rotogravure photographs of the beautifully gowned upper-class woman arouse a similar mixture in the mind of the lower-class woman, as she contrasts the apparel in the photograph with her own drab attire. Perhaps her comment on the lack of decency in the dress of the upper-class woman serves the same protective function as other "sour-grapes" mechanisms, saving her ego from painful comparisons.

Most bitter of all is the denunciation that is heaped upon the lower-class boy who, in fulfilling his social ambitions, casts off the ties of blood and old lower-class friendships. In Warner's study, the Starrs, actually *lower-uppers* seeking to enter the select circle of upper-uppers, had decided to disinter Mr. Starr's parents from a broken-down and deteriorated portion of the cemetery and to re-establish them in the family's new and more fashionable burial plot (Even the dead do not escape the rat-race of social mobility!) The lower-lowers who were doing the digging commented caustically:

"... he ain't worried about this place not bein' good enough for his pa and ma. He's worried about it not bein' good enough for him. I bet that son and daughter of his don't like to come down here with him to decorate their grandpa's and grandma's grave."

"Sure," the shovelman continued. "It makes those kids remember that their old man is just one jump from the clam flats. Why, hell! Old Grandpa Starr and my old man grew up together. Old lady Starr and my mother was in and out of each other's house every day. My mother told me old lady Starr used to borrow flour from her so that Phil Starr could eat enough to stay in school. Phil was a few grades ahead of me at the Smith school. He and my brother used to learn their lessons together. My brother and me quit school, and he went on through high school."

"He got to runnin' around with Cy Jordan and his crowd in high school. When that happened even his own folks weren't good enough for him then. Cy's old man gave Phil a job helping to take care of the books for the shoe factory. He was smart and learned fast. When he got out of high school he went into the factory, and in a little while he was Mr. Jordan's right-hand man. The next thing you know he's out on his own and partners with Jim Whitecotton. That old Neway factory made those fellows a fortune. When they shut up, old man Starr put his in stocks and bonds. He's got on the

board of a lot of banks, and there he sits on his ass in the old Cartwright house and tries to act like he'd been born in it.

"Did he go down to the flats to see his ma and pa then? He did not. . . ."*

Such thoughts convince the lower-lower that his hatred and resentment are justified. The upper-uppers are Midases, he is sure, devoid of human warmth and family feeling, more devoted to their coupons and directors' meetings than to their sons and daughters, devoid of filial piety, choosing the ties of status before those of blood. And such thoughts mitigate his envy, comforting him with a sense of his moral superiority. It is more difficult for the rich man to get into the Kingdom of Heaven—the scriptures reassure him—and he makes a special interpretation of the phrase, "the first shall be last."

PERCEIVING A CHANGING SOCIAL SCENE

Where shall we find the data, the facts, the raw perceptions of the social scene? In concrete *acts*, in verbalizations, in the "anticipatory adjustments"—in the very awareness itself? As in the case of the emotions, this last is accessible to no one save the person himself. If we turn to public documents and statements of opinion it is because of their accessibility; but, as the following studies suggest, these must be used critically. Behavior and verbalizations can be inconsistent, stated opinions and true perceptions can show wide divergence (as revealed in the data collected by different interviewers, different questions).

Nevertheless, with all qualifications recognized, it will be instructive to look at a few samples of verbalized opinion collected in areas of social change and conflict.

Social Attitudes and a Diplomatic Memorandum

The member of the diplomatic corps whose documents provide important data for the social scientist is not an observer who perceives the course of social change with impartial objectivity. He "views with alarm" those trends that threaten the interests of his nation, and particularly those that undermine the stability of his own class. His style of expression often implies that he is submitting exact and objective information when, in fact, he is making propaganda, indulging in wish-fulfillment; and the student of the social sciences is required to read between the lines, to evaluate the documents in

* Warner and Lunt, *Op cit.*, pp. 156-157. Used by permission.

the light of their historical setting and in the light of the social role of the individuals who compose them.

When, for example, Wellington Koo submitted his memorandum on communism to the Lytton Commission in 1932 his report included some very interesting observations on the Chinese mentality. According to Mr. Koo, communist ideology is so foreign to Chinese ways of living and thinking that, barring an unfortunate and improbable combination of circumstances it could never take root in Chinese soil. He called the attention of the Commission to the following points.

1. Communism is detested by Chinese "common sense."
2. Chinese individualism and rationalism would never submit to a dictatorship, to party discipline.
3. The Chinese family system is opposed to communism
4. The Chinese are an agricultural people, deeply attached to the soil. Upon their small holdings the farmer and his family have lived for generations. filial piety and love for the land are intermingled.⁷

With this array of self-reassuring arguments we might expect Mr. Koo to rest content. When he affirms that "mysticism is an *innate spiritual disposition*" that is not found in the Chinese (in whom common sense triumphs) he virtually claims that biology is on the side of the generalissimo's armies; for he asserts that communism becomes, in the hands of its ardent practitioners, a mystical religion. Yet he goes on to speak of the gravity of the communist danger, of its threat to "the very foundations of the social organization of China," of the importance of the economic rehabilitation of recaptured sovietized areas, of the importance of providing—through public works—relief for an impoverished people, and of the necessity of eliminating those "demoralizing conditions" that permitted the first successes of communist propaganda. And perhaps one should add, the importance of aid to the Nationalist government.

Now that we look back over three decades of social change in China the figure of Mr. Koo making astute observations on "the psychology of the Chinese people" assumes different proportions. Our hindsight should sensitize us to similar forms of what we might call *psychologism*, a brand of rationalizing all too common in our social sciences. In the hands of one writer it takes the form of *racism*—attributing powers, predicting the course of history, denying the possibility of change, all upon the basis of blood, race, genetic endowment. History is a record of the collapse of one after another of these racial dreams. In the hands of another writer it becomes a psycho-

logical form of *nationalism*—such and such reforms are viewed as out of keeping with the *national character*. Still another explains the character of a culture in terms of the *natural aristocracy* which provided its ruling class.

If we read these documents correctly they are to be viewed as weapons, as propaganda, as historically determined attitudes in a field of conflict and change. The collection of characteristics that are praised, and placed in opposition to “alien” influences, may or may not exist. In any case they can be no more than symptomatic, subject to multiple determination even as the changing moods and ideas of the individual. National character can change, improve, deteriorate. Every hitherto existing natural aristocracy has been replaced by newcomers whom it had despised. As it faces its own extinction or eclipse it has always seemed to a dying culture or class that civilization itself is threatened, that evil is about to triumph. Like the elder generation which sometimes yearns for “the good old days” it seems to turn inward and backward, seeking support in moral and psychological claims, seeking proof that its worst fears will not be realized.

Unhappy the man who as diplomat must frame and justify a program, appease conflicting groups at home, win assent abroad. While subject to these pressures he must endeavor to speak so accurately of men and affairs that those who read the historical record can adjudge him a man of probity and intelligence. Even as he writes he must realize that those who read the record will be no more objective than his contemporaries.

Public Opinion and the Opinion of Individuals

When we realize the way in which our society is class-structured, and when we discover that the status and role of the individual is correlated with his perceptions and beliefs about the society which surrounds him, a new approach to the study of public opinion is suggested. If it is true that the social differentiations which came with the break up of an early agrarian democracy have enforced new roles upon the individual, and if with his new affiliations and their attendant problems of adjustment he acquires a new attitude toward his society and toward himself, then any study of the citizen's thinking about public policy ought to take into account these new functional relations. Lord Bryce's statement, written in 1888, to the effect that “in the United States, public opinion is the opinion of the whole nation, with little distinction of social classes,” and that “what the employer thinks, his workers think,” may well be questioned. This observer did not sample the opinions of the Chicago stockyards workers whom Upton Sinclair wrote about in *The Jungle*. He talked with the Harvard faculty, but not with the newly arrived Irish in Boston. America in 1888 was far advanced along a

road leading from the New England town-meeting democracy to the boss of the metropolitan political machine, from a relatively undifferentiated agrarian and family-centered way of life to an industrial civilization in which huge corporate enterprises had become the dominant economic units.

A Study of Opinion in an Industrial Community

In order to study the distribution of opinions in a modern industrial community, and to investigate the influence of the individual's role in the system of productive relationships, A. W. Jones interviewed a sample of 1700 citizens of Akron, Ohio. Akron was chosen because it was a one-industry town with "growing pains" in which sharp conflict had involved the interests of the entire community. Using a controlled-interview technique, each participant was presented with a series of eight anecdotes dealing with a conflict between property rights and what, for want of a better term, might be called "human rights." The opinion of each participant was sought as to the kind of solution of the conflict he would approve. The eight stories were presented to teachers, filling-station attendants, CIO rubber workers, owners and managers of large-scale enterprises, rubber chemists, clergymen, and so on. The income, occupational status, amount of education, of each respondent were recorded along with his opinions. In a few instances more detailed case histories were worked up, but for the most part the interviews were completed in less than an hour. The investigator's general impression was that the issues were regarded as real, as "live," and many of the participants responded with a great deal of feeling.

The nature of the anecdotes used by the interviewers may be indicated by the following sample:

"Anthracite coal mining in Eastern Pennsylvania was a 'sick industry' even before the depression. In the 1930's still more mines shut down, the companies deciding to keep their coal in the ground until prices for it should go up. There was great unemployment and distress among the miners. In these years the unemployed miners began going into the idle mines and taking out the coal. They did this without the permission of the companies which own the mines, and without the interference of the local police, so that no violence resulted. They have both burned the coal themselves, and sold it."

Question: What do you think of this sort of action on the part of the unemployed miners?

[Answers were scored according to a five-point scale.]

0. I approve.
1. I think it may have been all right if they were really in distress, but I'm doubtful about it
2. I can't decide.
3. I suppose it is wrong, but I must qualify my feeling. For example, I think it wrong for them to sell the coal, but not if they merely burn it to keep warm.
4. I disapprove, and cannot let my sympathies interfere *

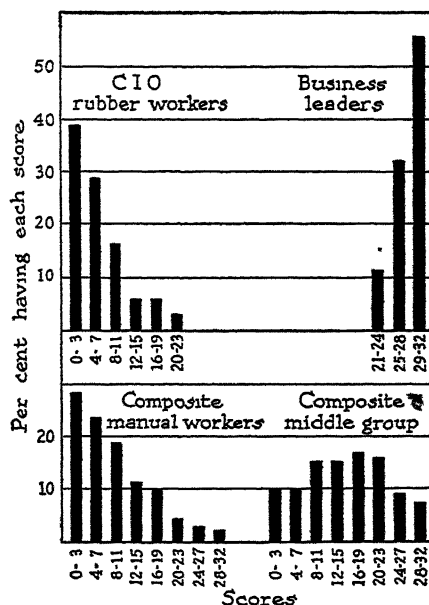
Other stories dealt with: the seizure of a power plant by electrical workers who used the tactic of a "stay-in" strike, a bank's eviction of unemployed tenants for non-payment of rent and the forcible resistance of the eviction officers by the neighbors, the use of tear gas bombs in evicting sitdown strikers from a plant, the use of a threat by a rubber company to move plants from the city as a means of enforcing acceptance of a wage-cut, and the like. The highest possible score, a score that would be obtained by a participant who gave unqualified approval to the action taken in defense of property rights, was 32; the lowest, zero

The business leaders vs. the C.I.O. Eighteen business leaders gave answers that scored between 21 and 32 points, ten falling between 29 and 32. There is a certain "appropriateness" in these scores when we consider the role of these leaders (as they and their peers conceive it). In a highly competitive industrial community in a period of labor unrest these business leaders could scarcely deviate from their course. Any one of them who expressed sentiments or pursued policies with a heavier emphasis upon "human rights" would have had to face attack by his board of directors, and in all probability he would have been replaced by a manager who could act more in accordance with his role.

The scores of the C.I.O. members ranged from zero to 23. The graph (Figure 68) shows a pronounced trend toward unqualified approval of the defenders of "human rights"; but there is a wide range of answers, some agreeing with the least property-conscious of the business managers. A composite group of manual workers, including some who belonged to company-fostered employee associations, showed an even wider range of opinion, some of this group agreeing with the staunchest defenders of property among the business leaders.

* A. W. Jones, *Life, Liberty, and Property* (J. B. Lippincott Company, 1941), p. 358. Used by permission of the author.

FIGURE 68. Scores of four groups on an opinion study in an industrial town. [From Jones, *Life, Liberty, and Property*, p. 320 Used by permission of the author.]



A middle class group Lying between the C.I.O. and the business leaders is a group composed of chemists, office workers, school teachers, ministers, small merchants. Here the extremists are in the minority, and the scores appearing with the greatest frequency fall in the middle range, between 8 and 23. A random sample of the city as a whole (obtained by a mechanical method of selecting names from the city directory) gave a distribution similar to that of the middle group, except that in the 303 scores here obtained 33 fell at the zero position on the scale. The preceding years of intense organizational activity and propaganda, and the struggles over wages and employment, had developed two contending extremist positions against which any "tendency to conform to the average" could be pictured as working. Had the conflict deepened with worsening economic conditions a U-shaped curve would have emerged. With the production of war materials and the return of stability in employment and wages, the situation has eased; but election results indicate that the central tendency of opinion in the community as a whole has continued to lie a little left of the midpoint of the scale.

The rubber workers who had not been drawn into the C I O showed a range of opinion similar to this middle group, with many sharing the opinions of management. (Of 69 non-C.I.O. workers interviewed, 15 gave scores falling within the range covered by management. Of 37 company union men, 14 shared the opinions of management.) Taking the scores of *all* the workers

interviewed, 10 per cent shared the opinions of management; 28 per cent of all the workers took the extreme (0-3 scores) position on the left; 56.3 per cent of the business leaders took the extreme position on the right (28-32 scores). On all counts, therefore, it would appear that there was a greater range of opinion among the workers than among management, the workers sharing the "property-consciousness" of the owning and managing group.

The technicians (rubber chemists) showed every shade of opinion. Of the 24 chemists interviewed, 12 agreed with management. One took the extreme leftist position, seven fell between 16-19. Although they had enjoyed extensive education (five of the twenty-four were Ph.D's and all had completed college) this background factor did not differentiate their median score from that of the Summit County farmers who had had little beyond the eighth grade in schooling. Nor did their greater amount of experience with verbal-symbolic materials produce any sign of hesitancy or deliberation as they gave their decisions. "Their opinions seemed right and logical to them and little in need of verbal defense"* Perhaps there is little transfer of the habits of thought developed in the laboratory, or possibly these technicians have already developed well-reasoned answers to social questions. In response to a story involving the use of tear gas by the chief of police in the effort to evict strikers who had occupied a plant—a story that proved to be the most sensitive indicator of class viewpoints—only three of the chemists disapproved of the action of the chief of police. In this period of intensive struggle between the two extreme groups the technicians were aligning themselves with management. In this instance it would seem that it is not so much the *possession* of property or the present level of income that influences attitudes, as it is the family background, the social connections during and after college, and that "junior executive mentality" which aspires to managerial status in the future. The median salary of \$2750 in this group was undoubtedly surpassed by many C I O members. Ten of the chemists earned \$2000 or less, and five \$1500 or less. In their social cliques, however, they were constantly confronted with people who held the attitudes of management; and the solution of their personal-social adjustments, as well as the realization of their professional ambitions, seemed to be the definitive factors in the formation of their opinions.

Income and education When the scores of the respondents are reviewed in connection with the reported years of schooling an interesting relationship appears. A correlation of $+ .43$ indicates that the increase in the amount of schooling was accompanied by higher scores. While we cannot say that a

* *Ibid*, p. 192.

greater amount of education *produces* a greater amount of property-consciousness, we can say that the more educated members of Akron society tend to agree with management. It may very well be that we are merely measuring one of the characteristics of the higher social statuses. The members of the higher social statuses do tend to be more property conscious, to stand on the side of "law and order," to vote the Republican ticket (in Akron, at any rate). And they also give their children more education. Certainly, in view of the scores of the most highly educated groups in the study, we must admit that for this sample education has not exerted much influence in a direction *counter* to the "property-conscious" view.

The relationship between current income and scores is not as close as the relationship just discussed. The correlation, in this case, is but $+.24$.

Verbal generalizations and concrete choices One of Jones's Negro respondents who had been born and educated in the South was in every outward respect such a conformist that an observer would have been led to expect an extremely high score on the rating of the anecdotes. He was a man in late middle life, the father of a large family; and he had worked in Akron for twenty years as a boiler-room laborer. He was a member of the Baptist Church, and attended services regularly. He did not even want to talk about the controversial questions the interviewer raised. He disapproved of unions. Unions were not for colored people. He was against all strikes. The poor man, he felt, was like the son of a rich man, entirely dependent upon him. He could not afford to displease his employer. He should guard himself against all this wild talk of unionists. Since this man had been able to keep his job through the depression years, when so many unskilled workers—and particularly those of his own race—had been unemployed, his behavior and his expressed views impressed the investigator as realistic accommodations to the role life offered him. Jones comments, "It was impossible to find anything objectionable or fawning in his subservience."

It is interesting to note, in the face of so many verbal disavowals of affiliation with unions or with those who held views hostile to men of property, that on the specific issues presented in the sample stories this Negro consistently decided against management, against property. His score was 8. This is actually in the middle of the C.I.O. range (see Figure 68). Thus his responses to the specific issues are not unlike those of a group with which he disavows all sympathy. ("Unions are not for colored people") If we are to assume that his verbalizations in a free interview correctly indicate his "cognitive map" then we must admit at once that the directions he takes on concrete issues in the controlled interview do not correspond to this map. If

he *talks* with the philosophy of a business leader, and repeats the clichés of his minister and his boss, it may be that these are no more than "skin-deep."

This Akron study would seem to indicate that *if there is such a thing as a clear-cut class-consciousness* that grasps the social, political, and economic facts consistently and rationally from one point of view, a point of view determined by the real roles accorded in a system of ownership and control of the means of production, then it is a view that is rigorously held and followed by very few members of the working class. Many members of this class think with views of society that were worked out by and for entrepreneurs, members of the owning and managerial class. If these two classes possess divergent needs and interests, then we would be witnessing the fact of an individual in class A trying to solve his problems through the use of a map worked out by class B, a map in which the signposts and emphases (Turn here, Avoid that heresy, Do not join that!) are placed in the interest of solving class B's needs and problems.

In short, *if* there are unique needs and interests determined by class role, and if a consistent view *ought* to emerge (that is, can be reasonably expected to emerge in time) so that these needs will find appropriate expression in a map of reality which would conceivably lead to the solution of those needs and interests, we can certainly say that as far as this present study goes this has *not* happened to the working class in Akron, even after several years of rather intensive struggle. The shaping of an independent class viewpoint is a relatively slow process. An impatient and youthful reformer might hope that tomorrow will bring the revolution; and in his impatience he may look upon those whom he hopes to arouse as lacking in rationality, as unusually stupid. Let us hope that in the next stage of his development he will not discard the slow processes of patient persuasion and education, turning in his haste to the propaganda methods, the bread and circus techniques, which the dictators used in their struggle for power.

The attitude toward authority While we are considering some of the individual, biographical factors that produce variability in the attitudes within a class—and hence weaken the predictive significance of any purely economic analysis—we might mention those influences that arise within the family and clique.

A modern factory, like an army, is an authority system. Orders pass downward along a chain of command, and at each level individuals have to accommodate to them. Will the individual do everything in his power to comply, assuming on his part that there is justice in the commands? Will he feel a sense of guilt and inadequacy, a sense of failure, if he does not measure

up to what is expected of him? Will he assume that his foreman and the plant superintendent are reasonable men who have his welfare in mind, as well as that of the business as a whole, and that his future and his security depend upon his placating them and measuring up to their standards? Or is he inclined to be hostile and resentful, to be suspicious of all in authority, to suspect injustice and exploitation, to seek support among his fellows rather than in allegiance to authority, to stir up a solid resistance against authority and to find security among his peers rather than in the good opinion of his superiors.

Before the worker enters the factory he has had an experience as a student in an educational system. Here there were student groups with a certain solidarity, and there were also students who were submissive to their teachers, loyal to school authorities. There were students, for example, who were regarded by the school administration as insufficiently endowed with the "right attitude", and who would be—in the administrative eyes—poor candidates for the student council or any other responsible position. And there were others whom the teachers describe as "students you can always count upon."

And before the public schools there were the homes. First grade teachers find that from the beginning their charges tend to project upon them varying attitudes for which their own behavior offers no adequate explanation. Attitudes developed in the home, toward fathers and mothers, are projected upon the school teacher. Attitudes further developed and sustained, or retrained, are then later projected upon the judge, the policeman, the factory superintendent.

Thus, when we come to a sampling of opinions in Akron, though we classify the respondents as workers, as members of the C I O, we are also talking to teachers' pets, gang leaders, mamma's boys, children of permissive or authoritarian family backgrounds.

One of Jones's respondents, a strong union man who scored zero on the anecdotes, described himself as the black sheep of his family. Unwilling to conform to their plans, to join their church, he left home, rejecting his family and all their ways. "I have no use for them," he told his interviewer. The union seemed to be the center of his life. All his spare time was given to it. He read the literature and preached unionism to his friends. Yet he was by no means an extreme radical, politically. He was for democracy in the unions, and in the country at large. He wanted to see the majority rule in the union as well as in the country at large; and in neither place did he feel that this was the case. He was suspicious of the socialists in the union, and wanted to limit their power. He did not like the New Deal. It meant, to him,

that too few men were running things. He looked upon the union as a device for guaranteeing a fair wage and security. All he would like, he told the interviewer, was a wage-increase of about \$700. Emotionally and socially unionism seems to replace the extended family. It was his church, his club. It was where he spent his leisure and found his friends. In such a case it is possible that the attitudes toward management and property are rooted in the first experiences with authority, and that a score of zero is more symptomatic of a certain childhood than of a class-role or of class-determined theories.

The role of the clique One of the rubber worker participants whose income (\$1600) was approximately the same as that of the union man just described enjoyed social affiliations with middle-class groups. He and his wife, a former school teacher, belonged to two social clubs, played bridge with accountants, judges, preachers. They owned a home, a car, and were sending their son through Akron University. Like his fellow rubber-workers he rushed to join a union when the organization campaign was at its height; but when they talked about striking he promptly dropped out. He did not believe in strikes, any more than did those with whom he played bridge. He transferred his political allegiance from the Democratic party (to which he would undoubtedly belong if he had remained in the South) to the Republican party. He thought Roosevelt harmed business men, and he was strong in his condemnation of the idea of the third term, of the W P A., and of all federal and local schemes of relief (which, he felt, only fostered laziness among workers who were content to receive a dole instead of an honest wage for an honest day's work). His score was 22.

In his economic role he was a worker in a mass-production industry. Socially he moved in middle-class circles. This socially mobile citizen viewed the world through the eyes of the people he aspired to be like, and in whose social acceptance he found the status he most desired.

SUMMARY: THE PERCEIVER IN HIS MILIEU

Before the perceiver confronts the events that he must order—if he is to deal with them adequately—many forces have been at work. The *construction* that emerges, the *objects* that are identified, the *meanings* that arise out of the given (the presented) owe their precise nature to a multiplicity of causes. The perceiver, who makes something out of the event, who grasps, orders, identifies, lifts out, emphasizes, abstracts, fills out, amplifies, and

otherwise *creates* in the act of perceiving, is no solitary spirit, no isolated adjusting organism, no pure rational process. He is contaminated to the core with his social history, his participation in a culture, his membership in family, class, and clique. Embedded at birth, in human relationships, the very habits and machinery of thought are socially conditioned. Neither in the head, nor in the organism, is the whole secret of perceiving and attending, and thinking, to be found.

What we would otherwise be inclined to call the powers of the mind are shown—in the examples we have studied—to be, in a large measure, social outcomes. The strength, the intelligence, the acumen of the perceiver, as well as the contents, beliefs, the products and attainments of the attending and perceiving process, cannot be fully understood without viewing the perceiver against the background of his social matrix.

The individual perceiver here becomes almost a vortex, a point at which converging forces meet. The dynamic relationships pre-existing in the culture work upon the developing perceiver, determining his shape and his perceptual outlook. And, judging by the varied patterns of belief the human mind takes on under the impact of these varying matrices, the perceiver who is shaped must be made of extremely plastic materials. Man is culture-formed as well as culture-forming; and nowhere is this more evident than in his thinking and perceiving.

Although his perceptions have this social derivation, and although his “truths” depend upon a consensual validation⁸ (a sensing with others, a social reinforcement) and sometimes have a currency no greater than his clique, he is prone to view them as TRUTH, as absolute, and as the kind of perception any man might come to if his mind were not clouded with myth, superstition, error, or some brand of original perversity; and any imputation to the contrary is resented as an attack upon his personal integrity. Since his “truths” are neatly dovetailed into a tribal economy wherein his needs have found satisfaction, any assault upon his perceptions, his beliefs, is also an attack upon his personal security-system. But in addition to this matter-of-fact type of anxiety, his reaction carries an aura of righteous indignation; for it is justified by his tribal value system, sanctioned by the elders, and even by the gods. And he typically calls upon these when his views are attacked. His own inhibitions of such “other thoughts” (other modes of conceiving which, if they arise in his own thought stream are anxiety-laden, threatening both his security-system and the socially approved half of him) will find reinforcement in these tribal sanctions, opinions of respected persons, and the like. But since he has also internalized these latter forces in the course of his training it seems to him as he chokes down these thoughts that this is all

a matter of his own volition, judgment, will power, and that his better self has triumphed.

We thus arrive at a kind of sociology of knowledge, at a conception of pre-perceptual forces, unconsciously acquired trends in interest and belief, a kind of social *Anlage* or groundwork within which the individual's conscious acts of perceiving and attending arise. Before the conscious individual exists there is the social matrix into which he is fitted. Placed at a particular vortex, where a particular constellation of forces meet, there he takes on an orientation to a world with a particular shape. He approaches it with a unique point of view—that is to say, from a particular vantage point. In his own biography he will make a unique synthesis of these converging forces and yet, unique though his history may be, he will be characteristically Aztec, Balinese, British, middle-class, socially-mobile—or whatever the constellation decrees. In his thinking and perceiving there will be implicit assumptions, hidden premises, unconscious predilections, which lie too deep for his awareness. They were, in fact, prior to awareness. Though these forces issue in his act of attending and perceiving he seldom names them. Although he *is* a moment in tribal history, he usually knows that history, if at all, in an incomplete and imperfect fashion. Though he portrays the spirit of the times, the forces he synthesizes do not become explicit in his thought. Though he is related to a dozen dynamic constellations of interpersonal relations he is but incompletely conscious of the structure of those relations; in fact it will require most careful probing to uncover the main facts. Though he selects one object and one interpretation he is only partially aware of the forces that make him so selective. If this were not true we should not need to study the psychology of perceiving and attending.

The very complexity of the constellations within which the individual functions is enough to warn us against any single-variable explanation for human attending and perceiving. Though we grant the all-important role of social factors these are interrelated in most intricate ways. An adolescent member of an upper-upper household may also be in revolt against family restrictions upon his use of the car, his choice of a mate, and his hatred for the restricting parent may spread to embrace the latter's political opinions (which he characterizes as fascistic). A lower middle-class school teacher with less economic security than a rubber-worker may take on the class views of a sorority sister who stands for everything that is desirable in the way of social status in the eyes of the teacher, and as a result the latter will express the utmost horror at the thought of unions for teachers (who are *professional* people!). The lazy scion of an ambitious and energetic middle class family may express the ambitions of his "sociological mother"⁹—the maid who

gave affectionate care to the child when parents were too busy with other interests—and he will yearn, let us say, for a career as a saxophone player instead of desiring the social status of a business and professional leader, which his parents believe any “normal” child should want

The individual functions in many constellations, each with a pull of a certain strength. With additional information about each constellation our understanding of the individual is advanced; but attempts to predict the behavior and opinions of the individual on the basis of a single social factor alone usually fall far short of the mark. Yet it is through controlling the changes in a single variable at a time that the social sciences have made progress. Class, caste, sex, age, occupation, union membership, are studied singly, and the weight of the various factors in determining opinion on any specific social issue may be assessed. Yet when an *individual* is studied, this type of social statistics does not carry us too far. It provides a check list of background factors for us to consider. It gives us a possible set of generalizations by means of which to *interpret* the facts which we find. It gives us a basis for asking questions, formulating hypotheses, which we can test—though but partially—against the individual biographic career.

In the last analysis the understanding of the *individual*, and of the interplay of forces that have made him what he is, is clinical, literary, closer to the grasp of the artist than to that of the statistician and experimentalist, though we could hope that the artist would have a familiarity with the best scientific generalizations, with the relevant experimental and statistical studies, when he comes to make his synthesis.

REFERENCES

1. Robert Redfield and Alfonso Villa, *Chan Kom, a Maya Village* (The Carnegie Institute of Washington, 1934), p. 104.
2. John W. M. Whiting, *Becoming a Kwoma: Teaching and Learning in a New Guinea Tribe* (Yale University Press, 1941).
3. Gregory Bateson and Margaret Mead, *Balinese Character, a Photographic analysis* (New York Academy of Sciences, 1942).
4. *Ibid.*, p. 12.
5. George H. Gallup and S. F. Rae, *The Pulse of Democracy: The Public Opinion Poll and How It Works* (Simon & Schuster, Inc., 1940), p. 169.
6. Clyde V. Kiser, *Group Differences in Urban Fertility* (The Williams & Wilkins Company, 1942).
7. Wellington Koo, *Memoranda Presented to the Lytton Commission*, Vol.

II (Published by the Chinese Cultural Society, New York, 1932), pp 719-810.

8. Harry Stack Sullivan, "Conceptions of Modern Psychiatry," *Psychiatry*, 3 (1940), p. 20.

9 See, for example, the case described as "The Black Sheep" in Allison Davis and John Dollard, *Children of Bondage* (American Council on Education, 1940), pp. 185-204.

CHAPTER 12

The Perceiver and His Needs

From the very beginning of our account of behavior we have found it necessary to look at our problem from two different points of view. The *forced movement* conception of conduct (see page 29) looks upon the organism as a complex system of receptors, conductors, and levers which are *pushed* into predictable actions by the press of physical forces in the milieu. But in the very act of measuring the stimulus-response relations we discovered that the organism fights back, that the responding structures are far from passive, that the organism has compensatory mechanisms which maintain homeostasis against the deficit-creating changes which threaten its integrity. There are internal forces as well as those from without.

The Perceiver as Selector

In observing the learner we were impressed by the role of motivation and the importance of reinforcement, need-reduction. Experimental evidence shows that the pairing of stimuli can enforce expectancies; but it also indicates that what the learner does about them depends upon his own need-states. Zener's dogs (see page 301) formed CR's in the typical Pavlovian conditioning procedure; but when they had just been fed they remained indifferent to the warning cue, no longer salivating. Masserman's cats (see page 299), having developed an experimental neurosis in the conflict situation where needed food and feared air-blast were in close proximity, no longer showed fear when warning cues were delivered in the well-fed state.

And in the more complex learning settings where the insightful hypothesis provided a necessary and crucial stage in problem-solving, it was quite apparent that the problem presented and the problem seen were two different things. It was only when, under the stress of a felt want and with the proper constellation in the field the stimuli took on a shape, when means-end relations could be perceived, that the solution was released.

Even at the most primitive bio-chemical level the organism is a selector and organizer. The developing fetus takes from the maternal blood stream what it needs and builds these substances into nerve, bone, and sinew. Not only does each type of organism make its characteristic *demands* upon its milieu, but from moment to moment as its internal milieu develops and changes, its intake varies. Richter's parathyroidectomized rats (see page 172) seek calcium, while those with adrenals removed seek sodium; pre-adolescent boys scorn all females, post-adolescents "fall in love."

At the very moment when we were considering the social pressures that shape the views of the perceiver and determine his way of organizing his experience and behavior, we could not escape the fact that the very stability of the outcomes depended upon the way in which a culture handled the needs of those who develop within it. Moreover, in a culture as complex as our own, with cross-currents of ideas playing upon the perceiver, his own life style and his changing pattern of needs will operate as selecting agencies drawing from the milieu the ideas that are congruous with what is securely established within him. And as he develops and changes with age and experience, even as his needs and his moods fluctuate from day to day, his ways of structuring the world about him will change.

In Dr. Clara Davis' experiment (see page 195) with self-selected diets the children were presented with a tray containing as many as ten food dishes; and, depending upon their needs and satieties, they chose food that permitted them to grow as well as children with more rigidly regulated diets. And so we could conceive of the perceiver as searching among the many items in the cultural cafeteria, selecting those that suit his own nature, assimilating and internalizing them until these built-in structures have changed his very nature. Would that we could be as optimistic about the wisdom of nature in this case as Davis seems to be in hers and that we could feel certain that the portion of the culture that is internalized not only answers some need but also promotes optimum growth of the perceiving self, preserving a homeostasis analogous to that which a reasonably wise nature at least partially guarantees at the physiological level by its compensating mechanisms.

In its gross outlines the fact of selection is clear. When we choose our philosophies we are confronted with an array ranging from the pessimism of a Schopenhauer to the optimism of John Dewey. We choose our novels from among the works of the hard-boiled realists, or from those gloomy tales (like those of Thomas Hardy) in which the protagonists are pursued by a relentless fate, or from those cheerful brands of escapism that carry us away to gay adventure and romance where the happy ending is always there to resolve our tensions. Why does one seem *right*, true to life, satisfying, and not the other? Does it not arouse some sympathetic echo, fulfill some personal craving, resolve some conflict or confusion within us? Perhaps we *ought* to choose some other, but we do not, in fact; and if all of these choices are lawful, it would seem that, indeed, we *must* choose precisely what we do.

In matters of religion, this same selective process seems to be at work, even within a single religious tradition. One Hindu selects a brand of Buddhism that looks to western eyes like a schizoid withdrawal from reality, and another chooses a brand that encourages good works, integrating the believer with the life of his fellow-man. One Christian pastor will choose a Christ inflamed with righteous anger, scourging the money-changers from the temple; another will discourse upon Christ the socialist, the man with a social gospel; while a third will speak of the meek and humble Christ, the one who loved little children. Each of us, it would seem, approaches the cultural fountain with his own little bucket, carrying away that which is congruent with his own life style, or satisfying to his needs. Within this broad religious tradition the healthy soul, as James pointed out, finds support for his buoyant faith and a ready forgiveness for his transgressions, whereas the sick soul is ever reminded of his burden of guilt, his utter worthlessness.

The Case of William James

And if the role of the subjective factors is not at all surprising in the fields of aesthetics and religion, what shall we say when we find it on the very pages of the psychological text? James, for example, set up a kind of "steam-whistle" theory of emotional consciousness, in which the emotion was viewed as an awareness of a backwash from organic, visceral states. And, having experienced in his own person the hopelessness and the helplessness that accompany a severe depression, James knew how painful these backwash-states could be. But his depression was behind him when he wrote about the problem of emotional control! If the bodily state is the root of our emotions, then control is simple, he argued. smooth the brow, brighten the eye, contract the dorsal rather than the ventral aspect of the frame, and your soul will

gradually thaw As his depression lifted, his way of looking at emotional problems became as optimistic as that of Mary Baker Eddy. He forgot his former inability to dispel gloomy thoughts Now, recovered, he did not even stop to puzzle about the source of those energies that would magically transform the bodily state, so basic to the painful awareness The unhappy seasick traveller who views the world with jaundiced eye would certainly find little help or sympathy in James's Pollyanna creed.

There had been a time in James's life when he could not manage things so easily. In his youth he had suffered a severe depression, and then his thoughts were morbid, indeed; and he did not know how to lift them

"... there arose in my mind the image of an epileptic patient whom I had seen in the asylum, a black-haired youth with greenish skin, entirely idiotic, who used to sit all day on one of the benches, or rather shelves against the wall, with his knees drawn up against his chin, and the coarse gray undershirt, which was his only garment, drawn over them inclosing his entire figure. He sat there like a sort of sculptured Egyptian cat or Peruvian mummy, moving nothing but his black eyes and looking absolutely non-human This image and my fear entered into a species of combination with each other. *That shape am I*, I felt, potentially Nothing that I possess can defend me against that fate, if the hour for it should strike for me as it struck for him. There was such a horror of him, and such a perception of my own merely momentary discrepancy from him, that it was as if something hitherto solid within my breast gave way entirely, and I became a mass of quivering fear. After this the universe was changed for me altogether. I awoke morning after morning with a horrible dread at the pit of my stomach, and with a sense of the insecurity of life that I never knew before, and that I have never felt since. It was like a revelation; and although the immediate feelings passed away, the experience has made me sympathetic with the morbid feelings of others ever since. It gradually faded, but for months I was unable to go out into the dark alone.

"In general, I dreaded to be left alone. I remember wondering how other people could live, how I myself had ever lived, so unconscious of that pit of insecurity beneath the surface of life My mother, in particular, a very cheerful person, seemed to me a perfect paradox in her unconsciousness of danger, which you may well believe I was very careful not to disturb by revelations of my own state of mind. I have always thought that this experience of melancholia of mine had a religious bearing . . . I mean that the fear was so invasive and powerful that, if I had not clung to scripture-texts like *The eternal God is my refuge*, etc., *Come unto me all ye that labor and are*

heavy-laden, etc., *I am the Resurrection and the Life*, etc., I think I should have grown really insane.”*

It was but a few years after this that James was indulging in another bit of self analysis, this time in a letter to his wife. Fully recovered from his depression he had plunged into the business of teaching, had married, and had undertaken his two-volume *Principles of Psychology*. Now he could write:

“I have often thought that the best way to define a man’s character would be to seek out the particular mental or moral attitude in which, when it came upon him, he felt himself most deeply and intensely active and alive. At such moments there is a voice inside which speaks and says: “*This is the real me!*” And afterwards, considering the circumstances in which the man is placed, and noting how some of them are fitted to evoke this attitude, whilst others do not call for it, an outside observer may be able to prophesy where the man may fail, where succeed, where be happy and where miserable. Now as well as I can describe it, this characteristic attitude in me always involves an element of active tension, of holding my own, as it were, and trusting outward things to perform their part so as to make it a full harmony, but without any *guaranty* that they will. Make it a guaranty—and the attitude immediately becomes to my consciousness stagnant and stingless. Take away the guaranty, and I feel (provided I am *überhaupt* in vigorous condition) a sort of deep enthusiastic bliss, of bitter willingness to do and suffer anything, which translates itself physically by a kind of stinging pain inside my breast-bone (don’t smile at this—it is to me an essential element of the whole thing!), and which, although it is a mere mood or emotion to which I can give no form in words, authenticates itself to me as the deepest principle of all active and theoretic determination which I possess.”†

Thus one and the same philosopher-psychologist could see the world at one time as a terrifying place. He awakened with fear lying at the pit of his stomach, insecure and hopeless, thoroughly out of tune with the cheerfulness of those around him. At another time he felt full of confidence that outward circumstances would bend to his will. All he wanted was a fighting chance;

* Henry James (ed.), *The Letters of William James* (Atlantic Monthly Press, 1920), Vol. I, pp. 145-147. Used by permission.

Although his son has indicated that the description is autobiographic, the passage was quoted in *The Varieties of Religious Experience* (pp. 160-161) as from a French correspondent.

† *Ibid.*, Vol. I, pp. 199-200. Used by permission.

in fact without the challenge of a little uncertainty he missed a certain stinging pain within, a tense enthusiasm for the fray. So the mood of triumph makes us look upon the world as our oyster, the same world that, in our depression, looms crushing and terrifying.

Two Letters

In their *Principles of Abnormal Psychology* Maslow and Mittelmann present two letters of self analysis, written by two college students. One writes

"I don't trust anybody in the world, not even my mother. After all, people are all selfish deep down and are out only to get, not to give. If you relax for a minute they will take advantage of you. Even the people I have called my friends have always turned out this way and I have decided that the best thing to do is never to be too close to anybody and to keep my secrets to myself. If something good happens to you, they may all envy you, and if you get down, they all step on you and make fun of you and in their hearts they are really glad. Women are catty and jealous and all the men I have ever known have been out to get from me whatever they could. I decided when I was younger that there was no use getting hurt all the time and that the only thing to do was to be stronger than other people. Then they cannot hurt you. Now when I go out with a man I make sure that I have the upper hand. That was the way it was with my father and mother. My mother was weak so my father took advantage of her all his life. It doesn't pay to be weak. After all the world is divided into strong and weak people. You're either one or the other and I am determined that I will be one of the strong ones . . .

"Life is a hard thing. I cannot feel relaxed and happy with other people because I am always suspicious of their motives, but the trouble is, I cannot even feel relaxed when I am alone. I get the most horrible thoughts about everybody. Sometimes I think I hate everyone in the world, but I try not to show it. Even in my dreams I have these horrible thoughts and I wake up in a cold sweat . . .

"The one thing that drives me on is getting ahead in the world. I think the rich man is the one safe person. Everybody is afraid of him and doesn't dare try to pull any funny stuff. When he talks, everybody listens, no matter what he talks about. If I have a lot of money, I can get anything I want—fame, power, love, everything."*

When the perceiver looks out upon the world in this fashion, the very tensions that have contributed to his view seem to be reinforced and validated.

* A. H. Maslow, and Bela Mittelmann, *Principles of Abnormal Psychology* (Harper & Brothers, 1941), pp. 132-135. Used by permission.

by the presently imagined threats that he “sees.” If, indeed, the world is *not* such a terrifying place, this perceiver is nevertheless unable to discover the fact. The “evidence of his senses” convinces him that his worst fears are grounded. Although the problem of fixation is not explained—for if these perceptual anticipations were to behave as typical conditioned responses we should expect them to disappear when not reinforced—we can understand why this person (with such perceptions) would tend to avoid the very experiences that alone could correct them. A life style seems to be expressing itself in these perceptions, and the perceptions, in turn, guide actions, canalize energies, provide a “pseudo-environment” in which the particular life style seems sensible. Experience has provided a trap; perception and action move within a vicious self-reinforcing cycle.

An excerpt from a second letter presents the sharpest possible contrast; and if our ear tells us that it is somehow too, too, sweet, perhaps that is because our own life style is contributing to our perceptions even as we read, and that *reality* is for us a territory lying somewhere between the two worlds pictured by these students.

“I have the feeling of being at home in the world and at home with people. I realize now that I have always assumed that a person was nice until he had proven himself to be otherwise. I like them, therefore they like me. I have always had lots of friends, and as a matter of fact, I can think of very few people whom I have ever called enemy. One friend of mine once told me that I have such a nice view of the world because I bring out the best side of everybody I know. He tells me that the same people I like and who behave so decently and nice with me, behave in a very different fashion with other people. I think it is because they realize that I have no desire to threaten them or to hurt them, that I really like them, and that I am really pleased when something nice happens to them. In other words, they have nothing to worry about so far as I am concerned. . . .”*

Perceiver—Percept—Objective Situation

The examples we have examined are enough to indicate what is meant when we say that percepts arise out of the joint action of the perceiver and the objective situation. By *percept* we mean that organization of the field which is made by the perceiver. We refer to the “seen” object, the sensed world which is made up of all the meanings, anticipations, and evaluations the perceiver constructs both by virtue of the fund of his experience and by virtue of the facilitating and inhibiting stresses now provided by his needs

* *Ibid.*, p. 134. Used by permission.

and tensions. By the *objective situation* we mean the physical and material events that confront the perceiver, the stimuli that we can photograph, weigh and measure, the world of objects placed in geographic space and time—together with their groupings and interrelations. And by the *perceiver* we mean that organism, with its unique inherited structure and capacities, which has been shaped into a dynamic unity, that complex of skills, hopes, fears, tensions which is organized into a more or less consistent style of life. Out of the joint operation of perceiver and objective situation the percept arises.

The aspect of the perceiving and attending process that we are here emphasizing is the *personal* one. The same objective world, the same objective situation, can be structured very differently by two observers with different histories and different life styles, or by the same observer operating at different periods under differing patterns of needs, tensions, psychosomatic states. In the more extreme examples this ability of the perceiver to *project* an organization upon the objective situation creates for him a private world, even a world of delusion. Such a delusory world can contain such distorted anticipations that when he attempts to live by them nothing but maladaptive behavior emerges; and when he attempts to communicate with, or adjust to, other perceivers, misunderstanding and confusion result.

The paranoid perceiver, to choose one example, is both hostile and suspicious; and in the extreme form he sees enemies in the shadow, interprets the spilled salt as evidence of an attempt to poison his food. He hears the tug-boat on the river whistling, even as you and I, but he interprets it as conclusive evidence that the G-men are now closing in upon him. Even the friendly inquiries of the physician are warped into his pattern of suspicion and hostility until the latter, too, is given a role in the huge plot that comprises his systematic delusion. And if the physician argues, or tries to present contradictory evidence, the true paranoid stiffens his resistances, and the more persuasive the physician becomes, the more the paranoid is "of the same opinion still."

The homosexual who is struggling to overcome his tendencies is prone to read meanings and intentions into the behavior of the males who surround him. The innocent friendly gestures of the latter may be interpreted as attempts at seduction. Kempf describes a young patient who suffered a breakdown during military service on the Mexican border. He had fled into the desert in terror, fearing that his fellow soldiers were going to use their knives upon him. Admitted to hospital, he "constantly read secret, seductive meanings in the movements of everybody . . . Various patients seemed to make signs to him, indicating that he must submit to them sexually . . . He com-

plained of (the doctor's) personality as too strong and he felt hypnotized in his presence."¹

Clearly, in such a case, the patient has lost his grasp upon reality. To the slight objective cues (gestures and words) he adds a wealth of meanings that are of his own manufacture, as though deep-seated and poorly socialized cravings had overwhelmed the discriminative response systems that experience had established, producing distortions and disorder in the perceptual systems.

And in the late-life depressions we hear the patient, whose objective behavior has been no more wicked than our own, complaining of his utter worthlessness, of his having committed the unpardonable sin, of his being utterly incapable of understanding how anyone can wish to go on living. He complains that he is facing poverty, that no one will care for him, that he is unloved. The objective facts flatly contradict him.

Reality-System and Need-System

Normally our grasp of objective reality is too strong to permit our needs and cravings to distort perceptual behavior to this degree. At most our needs merely bend the framework within which we order our experience, or they provide an affective-evaluative embroidery or coloring for our percepts, or they motivate us to approach or to withdraw from what is presented, but *the structure of objective events is not grossly falsified*. Satiated, we may refuse the dessert, but we do not misidentify the cherry pie as a cigar. We do not (as one schizophrenic patient did) express our "leanings toward Catholicism" by imagining that our little real estate office, which is located next to the churchyard, is actually out of plumb, leaning slightly in geographic space toward the church building. Or, while we may be intrigued by the maiden, we do not go overboard, certain that she is fascinated by our manly ways, projecting our own wishes upon her. Yet the fringe of distortion is always there and wishes do father thoughts. When we are plunged into deep grief by the loss of loved ones, or battered by a series of disappointments, or angered by the atrocious behavior of those we trust, we, too, experience a loosening of our grasp upon reality, a distortion of the phenomenal world. We see the yawning "pit of insecurity" of which James spoke, or sense a tide of evil in the affairs of men.

Perhaps we should not say that we *experience* a distortion of our perceptions, unless we refer to those soberer reflections we make after the event. At the time we experienced no distortion, *as such*; it was those *others*, like James's mother, whose chronic cheerfulness he could not understand, who

were the puzzling problem. As for our own eyes, the veil had suddenly been torn from them, we no longer saw "as in a glass, darkly." The very intensity of our experience carries with it the stamp of reality and we say, as James did, "This is the real me!" Though our mystic mountain-top experience be ultimately traced to the oxygen deficit accumulating within our frontal lobe cells under the persistent breathing of a rarified atmosphere, and though our actual perceptions and discriminations are deteriorating by all objective measures, we give an almost cosmic significance to the experience of the moment. The world opens up to us. We see the deepest truth, suddenly. To be sure, we can scarcely phrase it. But phrasing it seems to be so unimportant. We *feel* it. Tomorrow, in the valley, we may say, "I was a little high last night, in more ways than one. I was tired from the climb, in the first place; and we had eaten too little, and so on." But at the time our experience bore the sign and seal of a true revelation.

If our analysis of the problem is correct, the total process of percept formation can be dramatized as a struggle between a "reality system" and a "need system." According to this view the "reality system" normally holds in check and canalizes the motivational forces. This system varies in strength and accuracy. In illness, in fatigue, in defeat, it is weakened. It is as though we released our hold upon a complex and confusing field; unable to bear the tensions of conflict, frustration, and delay, we simplify the structure of things, permitting the forces within us to warp our judgments. And in our childhood, when our contacts with the objective world have been so limited, and our habits are still so loosely knit together, so indiscriminating, so full of unrestricted generalizations, our tensional systems were not yet bound. Santa Claus and the fairies and all manner of wishful fantasies played unchecked by any inhibiting knowledge of what is possible (or permissible). At best, each of us, though adult, still possesses wide areas of ignorance where reality has not, as yet, shaped and bound our tensions. Consider, for example, those distant political events about which we really know so little, events that filter through to us in such fragmentary form (by way of a few hastily read lines of newsprint, or a snatch of comment on the radio or television) that imagination is permitted a free reign. And there are the intents and purposes of those around us, so poorly represented on the mask-like faces of our peers, who reveal to us only a portion of what is within them. And in this whole area of the unknown, and in all of those places where but a fragment of the face of reality is revealed to us, we are prone to fill out, project, not merely on the basis of probability, of oft-repeated habit, but on the basis of tension or need.

A Summarizing Generalization

Any sweeping generalization about the effect of the life style of the perceiver (and here we stress that more permanent organization of needs and cravings) upon the percepts he forms when confronted with objective reality, is impossible. In any particular instance we must study the varying contributions of the two systems we have been describing:

1. The intensity of constituent needs varies from time to time; and if we are to advance from a literary to a scientific psychology we must introduce objective measures of these tensional systems.
2. The sense of reality—the objectively cued anticipatory habits that serve to canalize and bind our needs—also varies.
 - a. It is less developed in childhood.
 - b. It is less developed in those areas where our experience is limited.
 - c. It cannot function effectively when the objective cues are too few in number or so close to the sensory thresholds that clear-cut organizations are not formed.
 - d. It is weakened by chronic failure, by exhaustion or illness, and by injuries to the reaction system (particularly to the central nervous system) which impair the organizing capacities of the individual.
 - e. It is dependent upon the support it receives from those around us (consensual validation), and is therefore subject to suggestion, social pressures, and to the influence of misleading contexts which clever propagandists arrange for us.

MEASURING THE INFLUENCE OF NEED-TENSIONS

If thirst can produce a mirage for the desert traveler, as is commonly believed, and if the thoughts of prisoners living on near-starvation diets become almost exclusively preoccupied with ways and means of securing food, can we not produce quantifiable shifts in perceptual reactions by controlling the milder intensities of such need-states under laboratory conditions?

It was with this intent that Sanford asked his subjects to respond to verbal stimuli with word-associations after varying fasting intervals (1-24 hours).² He also used pictures so trimmed that the total scene (of which only a fragment remained) was ambiguous and somewhat difficult to imagine. A baby's hand, for example, was interpreted by his young subjects (7-to-11-year-olds) as "He's pointing to a toy," or "He's sticking his finger in the pie." Word-

completions and drawing completions, in which two letters of a food-name or a part of a diagram of a food-object were exposed, were also employed. A sample of his results is shown in the following table.

*Food Responses Given before and after Meals
(10 Subjects, 7 to 11 Years of Age)*

	BEFORE MEAL	AFTER MEAL	RATIO
Word associations	10	5	2 0
Picture completions	15	6	2 5

In a later experiment with 64 college students he used longer fasting intervals and more varied tests. Figure 69 summarizes his pooled results and shows the relationships between his measures. Although Sanford interprets his data as supporting the hypothesis that "imaginal processes depend upon the needs of the organism," the results also suggest three considerations:

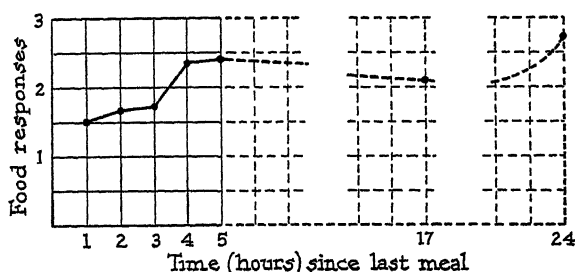


FIGURE 69. Relation between length of period without food and number of food responses, in Sanford's second experiment.²

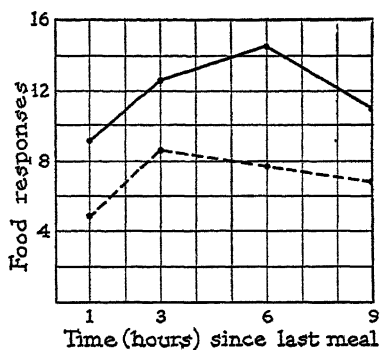
First. Although the need for food produces a measurable effect it is not the major influence determining responses. Considering the total number of food-interpretations possible, the subjects gave very low scores. Even in the "before meal" test where a total of 15 food-responses was recorded for the picture-completion test, it should be noted that this is but 4.2 per cent of the number of possible food-responses. The subjects were certainly not *pre-occupied* with thoughts of food. Shall we insist that *other* needs (not controlled or measured) dominated the perceiving process, or shall we stress the fact that the habitual responses to the presented cues demonstrated the

control of previous conditioning and reinforcement, thus throwing the control primarily into that category we have called the "reality sense"?

Second. There is a very low correlation between the length of the interval since the last meal and the number of food-responses. The period of greatest increase (between the third and fourth hours) does occur at approximately the point at which the stomach becomes empty. Beyond this point there is not a steady increase with mounting food-need. Values obtained at 15, 17, and 20 hours of fasting (averaged and plotted in Figure 69 at the 17-hour interval) are actually *below* those for 5 hours.

Third. The data furnish little evidence of a *distorted* structuring of the material. There is no evidence, for example, that diagrams of non-food objects are falsely seen as diagrams of food objects. Rather, it is the *fringe of meaning* that is added to the object perceived that portrays the presence and influence of the need. The effect, even in this periphery of meaning, is small under the conditions obtaining in this experiment.

FIGURE 70. Effect of lapse of time since last meal upon perception. Solid line, results of achromatic (black and white) series. Broken line, chromatic series. [Data from Levine, Chein, and Murphy, p. 283.³]



A Second Experiment

Other experimenters have attempted to measure the same variables. In a later version of Sanford's technique, Levine, Chein, and Murphy attempted to produce changes in the actual "seeing" process.³ They presented black and white drawings and colored prints behind a ground glass screen. Their figures (80 in all) contained 30 meaningless figures, 30 ambiguous pictures of food, and 20 miscellaneous household articles. Four fasting intervals of 1, 3, 6, and 9 hours, were used.

Figure 70 summarizes their results. If we total the scores for the two series (chromatic and achromatic) we find that the peak value (21.9 food responses) at the six-hour period shows a 59 per cent increase over the scores for the one-hour period (13.8 food responses). Since the experi-

menters did not publish a detailed analysis of their data, we do not know whether the increase appears in response to the ambiguous pictures of food or to the meaningless figures; hence we cannot decide whether the need has actually *distorted* the percepts or has, on the contrary, *facilitated* a more accurate seeing. Since there were 30 food pictures (and in all probability some utensils used in the preparing of food would be included in the list of household articles and hence increase this number) the total scores again fall far below the number of possible food responses.

Again we find that there is a low correlation between the length of the fasting period and the number of food responses. Wide individual differences were also found; for example, one subject with a 45-minute interval gave 13.75 food responses, another at a 2 hour interval gave 7.0 food responses.*

Ad hoc hypotheses The failure to obtain a close correlation between need-strength (as measured by the fasting interval) and the amount of shift in perceptual or associative material tempts each of the experimenters to invent additional hypothetical needs to make the data fit the original hypothesis. For example, in the second experiment, when the curve for the achromatic series falls at the 9 hour interval, the investigators suggest that "a reality process" (or a need for more realistic perceiving and acting) enters. "The growing need . . . makes it more imperative to find some means to satisfy the need, i. e. it stimulates the reality process." And ". . . as he becomes hungrier, he may ultimately stop looking at pictures altogether, particularly where all he has to do is to leave the experiment."⁴ Thus the total curve is presented as the resultant of the combined effects of an *autistic* process and a *reality* process.[†]

Sanford also invents an *ad hoc* hypothesis, arguing that as fasting goes on it becomes more irritating; and for the sake of peace of mind thoughts of food have to be suppressed. Just as one who is fasting would avoid a roommate who kept reminding him, "How would you like to have a nice big, juicy, steak?" he also avoids thinking of food. He reduces the displeasure of frustration by *not* giving those food-responses that his need prompts. Thus the

* These values were obtained from a control series in which repeated tests were made at the same interval. The values for the curve plotted in Figure 70 are averages for 5 subjects, each of whom was tested at all intervals.

† The *autistic* tendency is defined as the "tendency of cognitive processes to move in the direction of drive satisfaction." Unfortunately we have no independent measure of the reality need, nor any explanation of why it should arise at a particular hour. It would appear, too, that—viewing the total scene—the reality process is also one that moves in the direction of drive satisfaction, as the authors imply, and if that is true our definition has set up a distinction that is no distinction at all.

same will-power (or ego-ideal) that makes him carry out the experimenter's requirement to abstain from eating, now *suppresses* food responses. But again, since this is an imputed need, not measured, and brought in merely to bridge the gap between an hypothesis and a body of data that do *not* fit it very closely, we can gain little in the way of ability to predict behavior. When, for example, does the will to suppress begin to operate? Why at this particular point? Why in some subjects earlier than others? Why at different points with different needs? And are we to attribute *both* the facilitation *and* the inhibition of food-responses to the same need, signifying that a change in its intensity produces a change in the quality of its action?

The very impulse to bring in such patchwork hypotheses might appear to the logician to illustrate the autistic tendency even better than the data of the experiments themselves. In the effort to fit the data into a view that emphasizes the role of needs in the perceiving process, the experimenters have *invented* needs where none were measured; and they have minimized the undoubted increase in food-need over the longer fasting intervals, an increase that shows no corresponding influence on percepts.

A Third Experiment

Bruner and Goodman asked 30 ten-year-olds to estimate the size of coins and gray cardboard discs of coin size by adjusting the iris diaphragm of a variable shutter which controlled the size of a circular patch of light cast on a ground glass screen.⁵ They found a tendency to overestimate the coins by an amount varying from 16.5 per cent to 37.0 per cent even when the coins were held in the palm of the hand within six inches of the light. No such

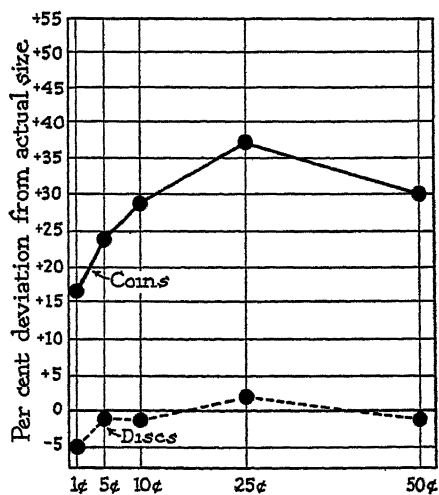


FIGURE 71. Errors made by 10-year-olds in estimating sizes of coins and discs (same actual size). [From Bruner and Goodman, p. 38.⁵]

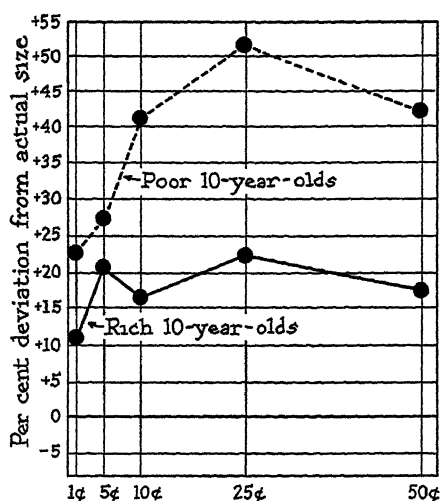


FIGURE 72. Errors made by poor 10-year-olds and rich 10-year-olds in estimating sizes of coins [From Bruner and Goodman, p. 40.⁵]

tendency appeared when paper discs were used instead of the coins. Moreover, the more valuable coins (quarters and half-dollars) produced greater errors than the penny and nickel. Here the valuation of the object appears to produce a generalized effect, to create a kind of halo. Although the directions call for the matching of *visual* size only, it is as though the larger piece of candy (or the longer ride on the merry-go-round) the larger coin can purchase actually introduces a meaning that distorts the spatial adjustment of the motor apparatus, making the coin appear larger than it is in reality. When the children were divided into two groups, according to the socio-economic background of their parents, the poor children showed a much greater tendency to exaggerate than the children of the well-to-do parents.

Curiously enough, the curves presented in Figures 71 and 72 show the same reversal in the general trend of the data that we saw in the two preceding experiments. The half-dollar is not exaggerated as much as the quarter. The investigators hazard the guess that the half-dollar is less real to the ten-year-olds. "A half dollar at that age is, so to speak, almost too valuable to be real!" And as supporting evidence they offer the fact that this reversal in trend is not found in curves plotted for adults. The "dime dip," which shows in Figure 72, occurs in both children and adults, and in this case the discrepancy between size and value is suggested as a clue for further investigation.

A Summarizing Statement

It is apparent that, while each of our investigations has demonstrated some influence of need upon perception, only in the third is there clear evidence of *distortion*. In the latter experiment value and need have demon-

strably altered the spatial adjustments. It is also apparent that even in the meagre data so far obtained, a great many *ad hoc* hypotheses seem to be required in order to patch the observed facts into a comprehensible pattern.

It should be further noted that the needs here investigated are relatively simple. They are not of the order of complexity of such personality factors as narcissism, fear of rejection, sense of guilt, where we lack a simple scale along which to plot need-strengths and where there are no reliable measuring devices. In view of the limited knowledge now available, we shall have to rest content with having faced the problem of how needs contribute to the formation of percepts. The answers to the problem cannot now be formulated from the armchair but must await many more experimental studies.

PERCEPTS AS INDICES OF NEEDS: PROJECTIVE TECHNIQUES

In spite of the precarious nature of the experimental foundations upon which the hypothesis rests, the notion that deep-lying personality trends reveal themselves in a person's mode of perceiving, has gained widespread acceptance. It was inevitable, therefore, that clinicians—whose purposes require that they assess the personality structure of their patients—should attempt to utilize the measurable trends revealed in the percepts of their patients as an index of the personality itself; for percepts can be quickly obtained and analyzed under controlled situations, whereas the study of the person is a long process and often leads the observer into a morass of ambiguities and contradictions. If, as is certainly the case, the deeper trends of the personality are not open to view in the relatively brief and superficial contacts on the ward or in the office, perhaps a perceptual test would indicate their presence. If so, a tremendous saving in time and effort could be achieved, and uncertain, qualitative observations would be replaced by index numbers. Moreover, unless the patient is highly sophisticated the perception test will have the advantage of catching him off-guard. He will *project* his interpretations upon the test material, believing that the organization of ideas which he reports is determined by what is "out there." The need to "cover up," to defend himself against the prying questions of an interviewer, will not be mobilized; and with his guard down he will tell what the clinician wishes most to know. That is, *if the hypothesis we have been considering is correct.*

In order to be of greatest value the test materials should possess a high degree of ambiguity; for the more precise their structure and meaning, and the more completely the objective situation is presented, the less room there

will be for the personality trends to work out their effects. Instead, the cues, the past conditionings, the socially-sanctioned definitions of objects and situations would determine the results. The "reality-system" would dominate.

The hypothesis underlying these projective methods may be stated simply: *Individual differences in the relative strength of needs will be revealed by an analysis of the individual differences in percepts called out by standard test materials.* In order to validate this hypotheses it will be necessary not only to locate those dimensions of the perceiving process that will prove most significant; but there must also be some other independent measure of the needs themselves. It will not be enough to find narcissism, egotism, dependence, anxiety *in the pictures*. The phrenologist found indices of traits in the bumps of the head (on his hypothesis) and the necromancer finds them in the crystal ball. But if a painstaking study of a group of patients were to reveal trends in motivation that are indeed closely correlated with quantified dimensions of the projective test, then the "projection hypothesis" would be transformed to the realm of validated theory.

Aside from the saving in time such a test would bring about, the study of personality itself would be transformed from an art, like that of the biographer, to a science. Even with the best clinical procedures that can be employed, the organization and interpretation of all the data obtained in a good case history remain a task very close to that of the artist. Anyone who has sat day after day in staff conferences where cases are reviewed for diagnosis, knows how widely judges may differ as to the proper interpretation of the facts, even though they are reputedly of equal competence. And one learns to expect one type of formulation from Dr. A., a slightly different one from Dr. B. Perhaps the most charitable view of the matter would accredit Dr. A. with a special sensitivity to certain areas of fact. A less charitable view would look upon Dr. A. as "projecting" his own personality makeup upon the patient (and, therefore, as distorting the data).

If the patients are projecting, and the physicians are projecting, how shall we escape from the round of subjectivity? It is precisely at this point that the projection test enters. If the answers of the patient can be counted, classified, scored for significant trends—in such a reliable and objective manner that all who view the data are forced to the *same* conclusions—then we have found at least one anchorage in the shifting currents of subjectivity.

The "Thematic Apperception" Test

In a test developed at the Harvard Psychological Clinic, Morgan and Murray sought a means of evoking fantasies which would reveal "covert and unconscious complexes."⁶ In their own words:

FIGURE 73. One of the pictures used in the Thematic Apperception Test. [Reprinted by permission of the publishers from Henry A Murray, *Thematic Apperception Test* (Cambridge, Mass.: Harvard University Press), copyright 1943 by The President and Fellows of Harvard College.]



"The test is based upon the well-recognized fact that when a person interprets an ambiguous social situation he is apt to expose his own personality as much as the phenomenon to which he is attending. Absorbed in his attempt to explain the objective occurrence, he becomes naively unconscious of himself and of the scrutiny of others and, therefore, defensively less vigilant. To one with double hearing, however, he is disclosing certain inner tendencies and cathexes: wishes, fears, and traces of past experiences. Another fact which was relied upon in devising the present method is this. that a great deal of written fiction is the conscious or unconscious expression of the author's experiences or fantasies"*

A series of pictures, somewhat ambiguous in content and meaning, is employed. As each picture is presented the subject is urged to "tell a story," as dramatic as possible, indicating what went on just prior to the pictured event, what ensued, and so on.

Nineteen pictures (and one blank card) call for twenty stories in all; a second series of ten (slightly more dramatic and bizarre than the first series) follow the first test. The pictures touch upon human relationships that have affected us all, deeply, and offer a sufficiently wide range of subject-

* Christiana Morgan and H. A. Murray, "Thematic Apperception Test," in H. A. Murray, et al., *Explorations in Personality* (Oxford University Press, 1938), p. 531. Used by permission.

matter so that the subjects' interests can be sampled. There are pictures containing central characters with whom the subject can easily identify himself (and adaptations of the procedure have been made for different age groups and for each of the sexes).

The stories, of from 100-300 words each, which are produced during these two interviews, may be used to initiate free-associations, to explore the subject's memories in search of the root-experiences from which the perceptions are drawn, or they may be subjected to analysis and interpretation by the experimenter himself. Here, the inventors of the test assert, a *critical intuition* (a combination of empathy and psychological insight) which is best developed in clinical work where patient's productions are observed along with extensive personality study, is required. The materials are far removed from simple check-lists which are easily scored; the stories are complex, involved, with multiple aspects to synthesize and interpret. The kind of judgment called for is far from common, or foolproof. Training in the analysis of the stories for their underlying themes or motifs is required. Even so, the agreement among judges is far from perfect.

In one study of ten school-children, where four experienced judges analyzed the stories and then assigned a rank order for each of 30 needs that appeared in the fantasies, the inter-correlations of the four rank orders averaged .57. This is a lower agreement than we could wish for in view of the hope that the tests would give us that much-needed objectivity which this field of study seems to lack.⁷

In analyzing the content of the stories the investigators concerned themselves first of all with the hero, the one around whom the story centers, the one with whom the perceiver identifies himself, around whom interest seems to center, whom the perceiver resembles. Sometimes two heroes appeared, and the experimenters entertained the hypothesis that these represent two sides of the perceiver's nature. Or, they argued, the duality of his nature may be shown by placing a story within the story, as when—in the course of the story—the hero tells a story. Or the duality may be shown by the subject's choice of a character of the opposite sex (thus indicating a duality in his sexual makeup).

The investigators have attempted to set up a classification of needs, and they advocate the use of a rating scale indicating five grades of strength so that an index number can be obtained for each subject and each need. They have described, for each need, the type of material that indicates its presence. Thus the *need to play a passive role* may be indicated by a desire for quiet, relaxation, sleep, or by references to fatigue or laziness, or by expressions of preference for passive contemplation or mere reception of impressions,

or by yielding to others out of apathy or inertia. In addition to an analysis of needs they also sought a measure of *press*, the surrounding events that activate the hero, and *outcomes* (achievement, punishment, atonement, guilt, and the like).

Without dwelling at too great length upon the details of a scoring technique which, as yet, has not achieved too high reliability, we may ask: Of what value are such ratings of needs? Does the score on the thematic apperception test correlate with other measures of behavior, or with other measures of needs?

Validating the Apperception Test

Now it is possible by the judicious selection of case material to gain the impression that the themes of the stories reveal important trends in the lives of the subjects. For example, the single picture of a man climbing a rope calls out widely different responses in a group of young subjects; and when we place the stories beside the facts revealed in case histories it would appear that each perceiver is unwittingly telling about his own conflicts and aspirations. For example:

1. A girl who feels dominated by her parents and is actually restricted at home described the figure as "a man escaping from prison." Her prison seems to have governed the "filling out" process.
2. A girl who has an ambition to become an archaeologist sees "a man descending into a deep excavation to unearth secret treasures." Here the picture is not a picture of a man climbing at all. Even in naming the picture we have apparently projected, too.
3. A girl whose shyness with men and boys masks an underlying wish to be caught and overpowered by one of them describes "a man escaping from his enemies." (The description of the girl as possessing a "wish to be caught" is the clinician's and may also represent an interpretation, a projection).
4. A girl who resents her mother's domination sees "a sailor climbing into the rigging, later to lead a successful mutiny and become captain of the ship."
5. A boy with conflicts centering around bed-wetting sees a "fireman going to put out a fire."
6. A boy with a noteworthy tendency to be kind to helpless creatures sees "a boy climbing to rescue a kitten."
7. A girl who is unusually athletic and who strives to emulate her brother sees "an athlete competing in a rope climb."

8. An 8-year-old girl who shows a precocious interest in sex and who "eggs them on" describes "a workman working on a house, a nice fellow who is going to marry a pretty wife, own a little brown cottage, and have a son named Arliss."
9. A 9-year-old who likes to play poker, place small bets, but who dislikes any sign of acquisitiveness in others, sees "a burglar robbing a very wealthy man."⁸

If we go beyond impressionistic (and selected) data of this type the results are less impressive. In a study by Sanford and his co-workers 43 school children, who had been closely observed over a three-year period, were given the test three times. The overt behavior of the children had been repeatedly rated by teachers and by staff members who were conducting the study. These ratings of overt behavior followed the same classification of needs used in the apperception test. That such behavior ratings are not adequate measures of "the real child" is apparent from the fact that they varied from observer to observer. In spite of access to data from the classroom, interviews with parents, anecdotal records kept by the teachers, school reports, observation on playground, shop, and in extracurricular activities, the three staff members gave ratings that yielded average intercorrelations of .41. Apparently, even with long periods of observation, the experimenters did not "see" the same children. Although it seems somewhat like multiplying or averaging uncertainty, these ratings were pooled to form a composite index for each child, the pooling being accomplished in part through conference and mutual concessions, and partly through the averaging of scores that could not be so compromised. When these composite ranks were correlated with ranks in the apperception tests, the average of the correlations was .11. This is so close to the zero value, which represents pure chance, that it would seem clear that a knowledge of a child's test score would be of little practical value in predicting the behavior of the child.

The experimenters discuss the possibility that the test really measures the *inner* needs of the child, and that while some of these needs are expressed freely, some remain covert, repressed. They suggest, further, that where the culture forcibly represses a need (for example, sex, aggression) that need will tend to influence the projective test in an even more pronounced fashion. Conversely, with free expression (and satiation) there is less residual tension to influence the test results. The correlations do not seem to conform to this hypothesis, however. The values for "anti-social aggression" and "sex" are .11 and .10, respectively, and therefore approximate the average for the series. The correlations for "construction" (+.37) and "achievement"

(—.30) can scarcely differ as they do because of a differential action of repressive forces.

There are additional *ad hoc* hypotheses that might be discussed, but with little profit. They are all calculated to preserve the original hypothesis for which the experimental facts seem to offer such poor support. It would seem simpler, therefore, to admit that the original hypothesis of Morgan and Murray was intriguing, that the program would have brought great advantages if the tests could have been validated, but that, finally, the data do not fit the predicted pattern.

To take the other course involves a search for some independent measure of those needs described as true, inner, latent, unexpressed. Perhaps the development and validation of the so-called "depth psychology" and the use of the psychoanalytic method will be one method of arriving at the "inner needs." But until such measures are found perhaps we can afford to remain skeptical as to the value of the test.

A Summarizing Statement

The preceding experimental studies have attempted to correlate percepts with needs, life style, values, and with certain persistent trends in overt behavior. In spite of the plausibility of the projection-hypothesis (to wit, that in the act of perceiving we reveal our motivations, our inner selves) the evidence shows that, at best, the amount of such revelation is limited.

One persistent difficulty has been the inadequacy of our measures of the *other* variables. The percepts can be recorded, classified, and scored with reasonable objectivity (although the apperception test scores were found to fall short in this respect). The dominant trends in overt behavior are poorly seen. The strength of the food-need can not be inferred with accuracy from the time interval since the previous meal. And various inferred needs and repressive forces—for which no measures have been offered at all—can be entered as *ad hoc* hypotheses to rationalize the data; but each inferred item weakens the cogency of the argument.

There is, of course, an alternate course which should be considered. It is entirely possible that this "tendency to project" is a relatively minor one; and that our percepts normally follow the "logic of the situation" rather than the inner needs of the perceiver, permitting—at the very most—need-determined additions, a mere fringe of subjectively determined distortion. There would still be room for wide individual differences in the percepts, in this view, even though the process is always of "probable things"; for what *my* experience indicates as the most probable referent of a present sign or signal may not be at all what another would expect, since the experiences that have provided

the relevant conditioned responses are quite different. And though my wishes and fears may be active in the present situation, they need not be so strong as to convert doorknobs into doughnuts or geese into ghosts. That is, so long as I remain oriented, so long as I am not dozing off to sleep, so long as I remain my alert and rational self. The world which, in educating my needs, also taught me "what follows what" continues to shape my perceptions. The simple fact is that my percepts are *not* autistic, need-determined. They may not be correct. My experience may have been at fault—too narrow, too fragmentary, too unrepresentative. But, such as it is, I live by *it*, and perceive by *it*; and it is an experience *of*, not merely an experience *by*.

It will be when, as a child, or a person with too limited experience, I have no framework of anticipations to correct and discipline my desires and fears that the motives of the moment will be most apt to determine the percept-forming process. Or it will be when reason is unhinged through some pathological process, some organic lesion, or toxic physiological change, that the normal functioning of my conditioned responses will fail. Or it will be when fatigue, or traumatic experiences, or chronic withdrawal through failure have loosened my hold upon a correcting reality, or when needs of overwhelming intensity place too great a burden upon the not-too-solid framework built by experience, that the process will become primarily autistic.

Those who have pushed the concept of autistic determination of our percepts have been, typically, clinicians who deal with the pathological fringe of behavior. Morgan and Murray, who were most active in introducing the apperception test, indicated that when they placed the themes of a patient who was undergoing psychoanalysis beside the hundred hours of material that came out in analytic sessions (free-associations, dream analyses, and the like) the test materials of an hour or two "adumbrated all the chief trends which five months of analysis were able to reveal."

Rapaport, describing the reactions of depressed patients seen in the Menninger Clinic, finds their stories full of references to sin and morality, pre-occupations with sickness and death. "Why," they ask, "do you give me such gloomy pictures?" But he also found that some of them expressed "wishful fantasies in which love, kindness, and happiness fill the stories to the point of 'mushiness,'" as though some compensatory healthful trend were attempting to "see a way out."⁹

His "obsessive-compulsives" on the other hand gave extremely circumstantial descriptions, never letting themselves go. They were troubled by pictures that did not "fit together," and in doubt about the correctness of their interpretation. Often they were critical of the pictures, and the testing procedure itself.

His paranoids saw spies and thieves, people "sneaking up behind," and made far-fetched interpretations (which sometimes included the examiner and the test situation) For example, one said, "I think the artist just placed those legs there to see if that picture has any suggestion of sex to the interpreters; it has no sexual suggestion to me."

He found indications of strong (but suppressed) aggressions when his patients saw such things as blood-poisoning, men choked to death, parents blown to bits, surgeons watching a man die, a wife blown to bits, wrecked cars, insane killers. Although at the pathological extreme Rapaport presents material that *illustrates* these points, his data are less than satisfactory when looked upon as *proof* for our hypothesis, even in these cases.

This question arises, then: Should we take the cue from the pathological extreme, where the life style, the illness, the apperception test material are all of a piece, and transfer our insight to the normal subject, insisting that although the subject may be unaware of the needs he "expresses," although his life style does not show it (it may be repressed), nevertheless *the pictures show it*? The need *must* be there! And will the needs be as dramatically revealed in the perceptions of normal adults who presumably have such good working adjustments with their environment that their tensions never rise to the extreme intensity present in the mentally ill?

Before we can sensibly evaluate such logic we shall have to consider other factors that shape our percepts. Murray and Morgan admit that the themes reported by their subjects often can be traced to books and moving pictures, to recent experiences of the subject (or of his friends and relatives). If such residues, near the surface, can influence perceptions, then we need to be cautious about inferring "deeper trends of the personality" from the data. And we need to be cautious in bringing in unconscious (repressed) needs until we have a valid measure of these. Otherwise the circularity of our thinking can lead us only to pseudo-proofs. Our *hypothesis* is, after all, only an hypothesis, suggested in the first instance by pathological extremes. And we may not say "the need *must* be there" merely because the pictures show it. The presence of the need is what was to have been proved.*

* In the case of one patient who had been under protracted analysis Tomkins notes that a recurrent fantasy, utilized almost daily by the patient, failed to appear in the TAT. Masturbation conflict, common in adolescent, is seldom the basis for TAT themes. Blind analyses of children's TAT's did not enable the clinician to guess the nature of the problems which had brought them to the clinic. Tomkins feels that the TAT opens up a rich vein of material for the study of personality but argues that: (1) not all of the materials are of significance, (2) many significant items fail to appear (and some are intentionally withheld), (3) considerable caution is required of those who use this exploratory tool.¹⁰

CONCLUDING REFLECTIONS UPON THE ROLE OF NEEDS

There is an area within which the projection hypothesis seems most fertile. Of all the "objects" that engage the perceiving and attending process, the "personalities" of those about us—particularly those with whom we are most intimately bound by affectional ties, or against whom we are pitted in aggressive-competitive struggles—are most subject to need-distortions

The youth who is deeply in love can see no flaw in the object of his affections. In fact, something like an affective toning generalizes to color all the world about him. He awakens to a "wonderful morning" and sees good in everyone, anticipates a rosy future, and "forgives all."

Conversely, the boss—who, as kindly mentor, looked out for the novice and could do no wrong—is later perceived by the novice, now grown old in the harness, and second in command, as an altogether different person. Waiting for the retirement of his boss, fretting under the latter's restraining hand until such time as he can institute radical changes in the firm's policies, the novice now sees the flaws in the boss's character.

And in the realm of social events two conditions conspire to produce distortions. One is the sheer lack of factual knowledge. The daily press, through whose columns we receive our impressions of distant and complicated events, is essentially an advertising medium, a corporate enterprise founded for profit. Though social theorists rightly point out its very important role in a democratic society, the newspaper is neither founded as a missionary enterprise nor as an educational institution. The managing editor's finger is constantly upon the pulse of reader interest, for circulation determines income from advertising. Therefore the newspaper must entertain, amuse, respect both the existent prejudices and the intellectual limitations of distracted readers who spend but a few hasty minutes per day in looking at its pages. If a reasonably true picture of distant social events does leak through, it is almost in spite of the determining conditions.

Thus the reader, a citizen, lacks the adequate experience and knowledge, the sense of reality, the proper orientation, the knowledge of "what follows what," which normally serve to check our impulsions. And since his role—besides giving him a *place* from which to view the social scene—also creates tensions, insecurities, desires, these subjective factors are free to run riot, warping the percepts.

And in all of this we have not touched upon the question of propaganda.

These very conditions that weaken the validity of our social perceptions leave the field open to those interested persons who would manipulate and control our percepts. Add to the fact that the channels through which our knowledge of distant and complicated events filters are actually devised for quite different purposes, the further fact that they can be diverted to the interests of a Bilbo, a Huey Long, a Gerald L. K. Smith—or Catholicism, or the Democratic Party, or isolationism, or communism, or to the aims of the National Association of Manufacturers—and we can see that the “behavior environment” of the reader becomes corrupted at its very source. The very tensions that will later falsify his views of the enemy’s acts can be whipped up by these stereotyping agencies under our present scheme of ownership and control. The “iron curtain” of a dictatorship (or of a country where advertisers and special interests control all mass media) can build a tissue of half-truths into a psychological certainty for its citizens, and Americans will be viewed by those readers behind the curtain as the rotting remnants of a vicious and decadent pluto-democracy. The Russian schoolchild with whom the wife of an American correspondent in Moscow chatted could scarcely wait to ventilate his puzzled confusion. Charmed by the refreshing personality of the visitor he asked, “But mamma, isn’t she a capitalist?” Nor do we have to stretch our imaginations too much to conceive of the American counterpart of this example.

For all of these reasons, when we assign motives to the behavior of others we could well afford to realize that we are *evaluating* and *interpreting* their conduct, that in fact we commonly lack the information that would be required to validate our interpretations. And to the degree that we are personally involved we can expect to find the process of projection at work, distorting the very data with which we think. In fact, when we discover a prone-ness on our part to project upon those around us some characteristic or recurrent role we might very well use this awareness in advancing our own self-knowledge. It is for such a cumulative and progressive extension of insight into the dynamics of interpersonal relationships that training in clinical psychology strives.

These remarks have taken us once more back to a literary psychology and to the clinic. What the laboratory has shown so poorly common sense and clinical experience reaffirm. In fact, the deepening crisis in international relations, the war of ideologies which threatens to engulf us all, looms like a mountainous wave. If we, counting our pebbles by the quiet shore, cannot find the laboratory proofs to certify the projection hypothesis, at least we should be gripped by the certainty that, unless we come to terms with the conditions that permit needs to distort our perceptions in the practical world,

we shall have neither the laboratories nor the leisure in which to investigate and reflect.

TWO WORLDS: LIFE SPACE AND REAL SPACE

As our needs become organized into a life style, as our accumulating experience teaches us what-follows-what (and establishes generalizations that reach beyond experience) the psychological field within which our action takes place extends in space and time. The infant, living in a more or less discrete series of present moments is replaced by an adult with a past and a future; and the confused aggregate of stimuli is replaced by a structured field.

Reaching into a past and a future, and spreading beyond the geographic present this space within which we live and act never matches, precisely, the life space of another human being. Within our tribe there is a considerable area of agreement; within our class, party, clique there is still more; and with an identical twin there would probably be the greatest correspondence of all. As we pass from tribe to tribe, especially from the modern to the primitive community, we become aware of the fact that these others do not live in a world like ours. Inclined, as we are, to describe our world as the *real* one, their world seems shot through with subjectivism, distorted by wishes and fears, filled with mythical spirits. Their needs, we say, have conjured up the rain-bringing friendly ancestors. Or, we note that it must be the savagely competitive Kwakiutl way of life that has projected its mirror image into the spirit world; and in evaluating their way of life in terms of the values of our culture we reject both their gods and their tribal ways; they get the gods they deserve, gods who crack men's skulls, infect them with disease. And we see their dionysian ritual dances as ways of tribally validating these fantastic and unreal beings. A tribe, we muse, is a way in which men can go insane together without realizing the fact.

And we observe that primitives do not perceive as we do: the "objects" that lie before their eyes are infused with spiritual forces, mystic powers. From the bowl or dipper whose shape is mysteriously connected with its powers, to the shaman's bag of divining objects, every object is infused with powers which, we know, do not lie in the object itself. These imagined powers come from their life together, their ritual dances, their yam-planting ceremonies, their jointly facilitated frenzy, their biological needs which find reinforcement in the tribal way of life, their learnings with attendant fixations and false generalizations (which only a systematic and scientific system of retraining could extinguish).

Thus we split, in our thought, the seen world, the life space, from the real world, the objective world, the world of the geographer and the physicist, the civil engineer, the man with a measuring device. *Others* imagine, *we* see. They permit *fantasy* to solve their problems, *we* *reason*.

Looked at from the vantage point we now occupy, human history has been a long *un-learning*. Bit by bit we have chiseled away from this fusion of reality and myth, of fact and fantasy, of truth and wish, all but the bare structure of events, the what-follows-what of science and validated experience. At long last our cognitive maps provide us with a reasonable fit. Our perceptions correspond to, or represent reality. (Almost!)

In some respects this chiseling away of subjective factors has left our world, the matter-of-fact world of science and practical affairs, the poorer. Stripped of its mysterious and magical aura our world is *mere* matter-in-motion. Disease is no punishment for wrong-doing, but the work of micro-organisms. Earthquakes are not the punishment sent by a deity to warn a wayward people who have forgotten his precepts, but a fault in the rocky strata of a cooling planet. Fire is no sacred force, but a series of controllable physico-chemical changes. Birth is no magical entrance of a spirit but the culmination of a very matter-of-fact series of biological events. And man, himself, no creature of epic proportions, becomes a complex physical object moving through a world of whirling electrons. Warmth, excitement, ecstasy, terror, are replaced by the cold, mechanical universe of the astronomer and the physicist; and something within us feels the poorer. For all the gain in power over nature, we are moved to exclaim against the one for whom it could be said:

A primrose by a river's brim
A yellow primrose was to him
And it was nothing more.

Two Fields

Yet there is reason to believe that the mystery and the terror of human existence has not been banished by all this development of a matter-of-fact view of life. The rise of science has not crushed the imagination, nor has it banished novelty, the unknown, the uncontrolled; nor has it brought us to the point where our perceptions are no longer affected by wishes or fears, no longer infused with the tribal life, no longer shaped by our integrated need-systems. If experimental evidence fails to reveal impressive evidence of this fact, so much the worse for experiment. Perhaps one answer lies in the fact that the experiments, themselves, are framed within the boundaries of these forces; and perhaps a second answer lies in the trivial character of object and

act studied in the laboratory. In a genuine sense the problems are often artificial and meaningless in comparison to the tasks life itself offers.*

In order to clarify this point let us make use of a distinction—a distinction that is only partially correct but one that will help us to see our problem. If we visualize an area, spotlighted, in which objects stand forth in a bright light, and if we think of these objects as familiar, with their interrelations thoroughly explored and their properties tested, we could let such a spotlighted area symbolize the matter-of-fact world, the world of science and measurement, the world of exhaustive and exact knowledge. There will be shadows in it, of course—unknowns which we cannot see clearly—but the main outlines are clear, the possibilities can be stated. Here no *wish* can distort our perceptions. A hammer will be seen as a hammer, a bowl as a bowl. No thirst can make us see water where none exists, no fear can conjure up enemy or ghost. We can name the objects and move them in specified ways, predicting the consequences.

Until this spot-lighted group of objects is *ordered* by a perceiver with purposes it is both meaningless and inert. When the perceiver with his needs begins to emphasize, reject, accept, arrange the objects, the field takes on a structure. There need be no *distortion* in the process; the arranging can respect both the properties of the objects (and each object is a well-spring of such properties) and the needs of the perceiver.

If our analogy is to approximate our everyday human experience, two emphases must be introduced. In the first place, our *interests* and plans reach far beyond the spotlighted area, far beyond the penumbra of shadowy half-seen shapes. And our life space, the world we imagine as real,† stretches far beyond the spotlighted area. *A hoped for position and role within this expected but uncertain and not yet realized beyond* pulls us forward, and as we survey the objects in the brightly lighted field we interpret them in the

* If one could get outside his own school of psychology and observe the fact that with different postulates and procedures psychologists now find it possible to draw up different laws of conduct, different principles of human behavior, and find evidence to *validate* them—this, alone, would be enough to suggest that the subjective factor has not been eliminated by our scientific procedures.

† Real or no, our beliefs, our expectations, are strong enough to provide the supporting framework for our movements. And this universe is an expanding one, developing, changing. The charmed circle of the spotlighted area could be ever-so-fixed and bound, a truly closed system. The living space of a human being, constantly expanding and changing, would nevertheless reveal new properties in the objects within the lighted circle. The properties of the matter-of-fact object are never exhausted, therefore, in any scientific account. Maier's subjects used the pliers as *weights* with which to set a cord swinging. This "outside" purpose or plan enters to transform the order, structure, arrangement, of objects within the field, and this larger matrix determines significance, direction, emphasis, and reinforcement.

light of this goal and these expectations Here our needs and purposes are of the essence Together with the sense of the probable which experience has shaped they determine the structure of the field

And, in the second place, we should have to confess that in the fields within which our life goes on there are actually many shadows, many unknowns We see the surface shell of those around us, we do not even know the hidden selves within our own family Profoundly ignorant of many things within the spotlighted area, reasonably sure of some things within the shadowy future, the black-white contrast with which we started has begun to complicate itself. The properties of objects within the lighted area determine which of several wished-for futures is possible; the goals in the shadow determine which ones of all that wellspring of properties are now relevant. The live hypotheses are those that are *going our way*, the dead issues are simply irrelevant *to us*. Pull devil, pull baker; pull fact, pull wish and fear, pull spotlighted present, pull shadowy (and sometimes unconscious) goal of the future!

THE DREAM AND THE REALITY

The motivating forces within us are terribly persistent things Denied in the grim present they reaffirm their power in our fantasy of the future Are we mortal? Still we yearn for immortality; and some of us have constructed a promised land. Must we, in spite of our reluctance, go to war? Then this is to be the war to end wars Are our trials and tribulations in the present almost more than we can bear? Then in that future we shall be strengthened, prepared, able to cope with it all. Is there wickedness in high places? The time will come when the first shall be last and *we shall be enthroned*.

When experience has disciplined our wishes, sweeping out the magical and wishful elements from the spotlighted area of the present, and when we have become sober citizens with most matter-of-fact perceptions in all practical affairs, that which was swept out and denied sometimes reaffirms itself in utopian dreams; and these dreams form the matrix within which the objective present is seen Truncated actions, cut off, interrupted in mid-flight, creep back again, or remain to vitalize and energize other actions Defeated ourselves we cheer little David's fight against Goliath Mother's truncated career somehow gets into her plans for her son's development Disappointed middle-class citizens for whom there is no place within the ruling group form a constant threat to those above them; and if enough of them are frustrated they will create, together, a myth of the new state in which *all* can

find a share And this myth can capture all the discontent, for whatever reasons existing within the society

This reconstitution or reinstatement of the banished hope and expectation at the fringe of things, this reaffirmation of needs and desires, reacts upon the objective present, rearranging, suppressing, emphasizing What, we ask, can she see in *him*? No one else sees these possibilities Can't she see what is obvious? Love *is*, indeed, blind But it is not love, alone We can find evidence on the political sphere, as well. In a collection of essays called *The God That Failed*¹¹ a half dozen intellectuals who had either been in the communist party or sympathetic to its aims, in times past, tell the story of their voyage into and out of the orbit of the Marxian dream One by one they detail the circumstances of their original enchantment It is clear, as they tell their story, that they have mulled over these events, puzzling—in their present disillusionment and disgust with communism, and in their guilt in having once been associated with acts they now see as mass crimes—at their own course. It is not important to discuss whether their reasons are the correct ones, or whether their emphasis is properly distributed, or whether secret (and possibly anti-social) strands in their character of which they are unaware really prompted them We may merely note, in passing, as they present their characters to our view, that the motivations that prompted them were admirable. They hated injustice, exploitation, hypocrisy. They saw the good in men suppressed, denied And the Marxian dream came to hold, for them, the hope of the world We need to note, merely, that this is the way the self usually views itself; and we need to examine the influence of the dream upon these men as perceivers of reality How did the spotlighted circle of contemporary events now look to them? For a long time, they now admit, it prevented them from properly perceiving what took place under their eyes. How long, they now marvel

These "confessions," which recount the stories of six men of letters who left the pro-communist fold, represent more than a half-dozen instances of political naivete They represent something universal in human experience. They indicate that we see the world about us with our whole self, with all our accumulation of experience, with all our wishes, our standards, with all the socially structured ideology of our tribe and class The little fact is pulled into a powerful frame It is not altogether a question of distortion or misidentification of the object as such, but rather the aura of meaning, the emotionally charged frame of the future into which it is pulled, a frame which gives the fact its significance, its value, its pull The dynamic quality of the field is not a simple what-follows-what affair It is from us (or should we say *within* us).

In every moral decision, in our daily conduct, in our relations with others, we are constantly injecting ourselves into perception and act. We must. And in a measure we create a reality in so doing. There is a truth in the two letters (see page 394). By acting as though we trust those about us we create the conditions for cooperation. By our suspicious and withdrawn attitudes we produce in others that which validates our worst fears. If the laboratory fails to show the dynamic quality of our perceptions perhaps it is because, as subjects, we are so little involved. We are spectators of a spotlighted field whose properties and internal relations concern us but little, if at all. The "issues" are too often dead, rather than live.

Yet the stories do not drive us to a complete loss of faith in reason. The hard reality does crack the myth, in time. Whatever their own motives in taking up communism these intellectuals come to see that the party provides an avenue to power for some within the fold. Whatever the ideology, they can see the steady deterioration of real freedom of action, of intellect. Yet it is interesting to see that what reality has taught the one whose dream has been broken is not some simple, basic, incontrovertible truth. Leaving the six intellectuals aside, for the moment, we have to admit that the disillusioned have, in fact, turned to a variety of new dreams: one enters the church, a second becomes a Fascist, a third a disillusioned cynic. They have profited from experience, but the residues of wisdom vary, and fresh dreams are formulated almost before the fragments of the former are cleared away.

While learning goes on and we are discovering the shape of things, the broom of reality brusquely sweeps out our childish magical notions. Primitives and children as we once were, we now value "objective" knowledge to the point where we almost fear to act at all until every fact and consequence is known. Science, as James once reminded us, has become a sort of "organized nervousness." But for every human desire swept out by the scientific broom, for every need unrealized in the discovered shape of things, there reappears a new force in that shadowy field of the future—a utopian dream, a religious myth, an artist-philosopher's conception of life. The banished forces return to give meaning and emphasis to the spotlighted field, to arrange the objects, to give significance to some and to push others to the background.

While the surface melody of action is being played out, and while experience is teaching us what-follows-what, a silent obligato develops its contrapuntal force in the shadows. Sometimes this force breaks into our consciousness in the form of strange dreams, sometimes it creates "blind spots." Demonic, insistent, never fully realized, these residual needs have a way of breaking every mold, of forcing the learner to transcend every halfway

stage, and of forcing him to find new forms within which to reorganize, restructure the field. Though it must be respected, experience always has to be transcended. The pressure of unfulfilled needs can be so insistent that even the spotlighted geographic present is seen in distorted form. It was so with the primitives. And it can be so, now. Yet the power of the distorting dream is not ultimate. Facts slowly break its hold. It is the forces that gave rise to the dream that are not dissipated. They may be scattered, disorganized; but they re-form. The history of shattered utopias has never prevented the next utopia from forming. The faith we live by insists that out of a succession of such shattered utopias we are winning an ever widening spotlighted area, a broader field within which man can project goals with some certainty of accomplishing them. And this, we might conclude, is a utopian view of utopias.

REFERENCES

1. Edward J. Kempf, *Psychopathology* (C. V. Mosby Company, 1920), pp. 560-562.
2. R. Nevitt Sanford, "The Effects of Abstinence from Food upon Imaginal Processes," *Journal of Psychology*, 2 (1936), pp. 129-136
 ———, "The Effects of Abstinence from Food upon Imaginal Processes: A Further Experiment," *Journal of Psychology*, 3 (1937), pp. 145-159
3. Robert Levine; Isidor Chein; and Gardner Murphy, "The Relation of the Intensity of a Need to the Amount of Perceptual Distortion: A Preliminary Report," *Journal of Psychology*, 13 (1943), pp. 283-293.
4. *Ibid.*, p. 292.
5. Jerome S. Bruner and Cecile Goodman, "Value and Need as Organizing Factors in Perception," *Journal of Abnormal and Social Psychology*, 42 (1947), pp. 33-44.
6. Christiana Morgan and H. A. Murray, "A Method of Investigating Fantasies," *Archives of Neurology and Psychiatry*, 34 (1935), pp. 289-306.
 Morgan and Murray, "Thematic Apperception Test," in H. A. Murray, *et al.*, *Explorations in Personality* (Oxford University Press, 1938), pp. 530-545.
7. R. Nevitt Sanford, Margaret M. Adkins, R. Bretney Miller, and Elizabeth Cobb, "Physique, Personality, and Scholarship: A Cooperative Study of School Children," Society for Research in Child Development, *Monograph VIII*, No. 1 (Serial No. 34), pp. 258-300 (National Research Council, 1943)
8. *Ibid.*, pp. 295-300.
9. David Rapaport, *Diagnostic Psychological Testing*, Vol. II (The Yearbook Publishers, Inc., 1946), pp. 395-459.
10. Silvan Tomkins, "The Present Status of the Thematic Apperception Test," *American Journal of Orthopsychiatry*, 19 (1949), pp. 358-362.
11. Richard Crossman (ed.), *The God That Failed* (Harper & Brothers, 1949).

CHAPTER 13

The Influence of a Preparatory Set

The deep-seated and more or less persistent needs that characterize the person as a whole are difficult to measure and still more difficult to manipulate and modify within the limits of the laboratory setting. There are, however, a group of sets, attitudes, postures—of relatively brief duration—which can readily be induced either directly, by our instructions, or indirectly, by means of sequences of stimuli which we can control. Some psychologists refer to this group of processes as “mental sets,” whereas others look upon them as over-all neuromuscular patterns or postures. The latter group would choose as example the tensed posture of the runner on the mark, holding a set until the starter’s gun releases him. Still others think of these sets as primarily brain-sets, as though certain neural circuits, set in motion by the instructions, continued to reverberate. Before we attempt any analysis of their detailed nature let us look at some of the experimental facts that show how they function.

For the time being we may describe a preparatory set as an ongoing state of affairs whose presence facilitates some types of performance and inhibits or retards others. A cat crouched at the hole in the baseboard where a mouse has disappeared, a pointer “frozen” on a game-bird, would typify one subclass of preparatory sets; and in these cases the set involves the total organism—sense-organs, nerves, muscles. Such sets provide both a *readiness for* a cue-to-come and a *withholding of responses* until its arrival. The releasing cue for which the organism is set acts as does the pressure of a finger upon a trigger; a prepared mechanism explodes. As the studies will show, these sets

vary in their explicitness, in the degree to which they are conscious, and in the degree to which the consummatory response depends upon the structure and form of the releasing cue. And they differ in the degree to which the neuromuscular apparatus is tensed, alerted

The Reaction Time Experiment

One of the simplest illustrations of the phenomenon of set is found in the reaction time experiment. The subject is comfortably seated at a table. He is instructed to press a key as soon as a ready-signal is given and to hold the key down until the instant a certain cue appears (for example, a flashing light, a sound, an electric shock). The more rapidly he can release the key in response to the cue the lower his reaction time (RT) will be. An electrically operated recorder is in circuit with the key, and it is the interval between the onset of the releasing cue and the breaking of the circuit that is measured. These RT's vary from trial to trial, in spite of the subject's intent to react up to the limit of his capacity, and they vary from subject to subject. As a series of these RT's is taken, both the average duration of the interval and the variability from trial to trial decline until most reactions are falling between 0.1 and 0.2 seconds. It may require as many as 300 to 500 trials to achieve a stable and reliable measure of the best that a subject can do.

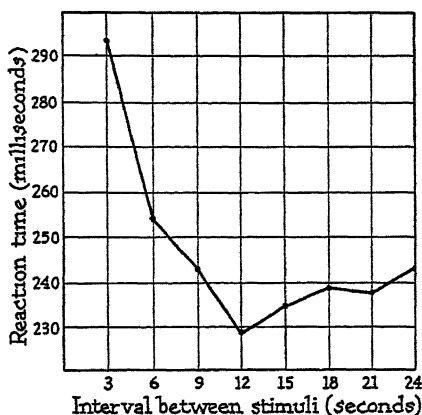
RT's vary with the type of releasing cues used, the average values reported for visual cues (0.2 seconds) being higher than for auditory cues (0.15) or for electric shock (0.15). Some of the difference depends upon the latency of the different sense organs involved. In the case of the eye, for example, we know that a chemical reaction of the photosensitive substances in the retina occurs before the light can activate impulses in the optic nerve, and this intervening photochemical process requires time. In the ear, likewise, the sound wave is converted to vibrations of the tympanum (ear drum), the bones of the middle ear, vibrations of lymph in the cochlea, vibrations of the basilar membrane, and finally impulses in the auditory nerve. Since the final response of pressing the key is the same in either case, the tendency has been to explain the greater lag in the visual-motor system by a greater latency at the sensory end of the neuromuscular arcs.

Varying the fore-period In recording a series of RT's the fore-period, which lies between the ready-signal and the releasing cue, is commonly varied. If this is not done, and if—on the contrary—a very exact rhythm of warning and release is set up, the subject will begin to react in rhythm to the sequence of the stimuli, so that his release-movement practically coincides

with the releasing cue. False reactions will begin to appear as he jumps the gun, indicating that he has reacted to the ready-signal and to the interval rather than to the releasing cue itself. It has been found, also, that the efficiency of the set depends upon the length of the fore-period. If it is as short as 0.5 seconds, the RT's begin to lengthen. RT's are also longer when the fore-period is more than 10 seconds.

Mowrer's data provide an illustration of the influence of set upon RT. Here the ready signal was dispensed with and the releasing cues spaced at a regular 12-second interval. Occasional test cues at intervals ranging from 3 to 24 seconds were scattered irregularly throughout the series. Most rapid reactions (see Figure 74) were found when the release cue fell on the 12-second interval (0.229). Cues appearing at the shorter intervals catch the subject "off-guard," incompletely prepared to react; and at the 3-second interval RT's have risen to 0.293 seconds.¹

FIGURE 74 The influence of set on reaction time. The subjects expected the stimulus at the standard interval (12 seconds), and RT's were shortest here. Stimuli at other intervals produced longer RT's. [From Mowrer, p. 9.¹]



The choice-reaction If the subject in the reaction time experiment is placed before two keys and is instructed to watch for one of two cues (say, for example, a red or a green light) and to release a right-hand key when the red cue appears and the left-hand key when the green light appears, the RT is much longer than in the simple reaction technique described above. If the two cues are presented in random order the subject's set for the final response cannot be as complete. The final movement of releasing the key has to be held in abeyance until the reaction to the color has had time to develop. The final response is therefore a reaction-to-a-reaction. Increases in average RT of as much as 0.2 seconds are recorded, an actual doubling of the RT.

Increasing the number of possible reactions, as, for example, when a separate key is assigned to each of the ten fingers, sends the RT up to 0.622 seconds. With each added key there is an increase in the RT, the ascent from the simple reaction requiring successively, 0.187 (simple), .316, .364, .434, .487, .532, .570, .603, .619, .622 seconds.²

The RT's are lengthened if the two cues for the choice reaction are very much alike, or by any complication in the patterning of stimuli which renders discrimination difficult. For example, when the subject is instructed to react to the side having the larger number of lights, and ratios of 1:2, 3:4, 4:5 are used, the RT's are 0.475, 0.656, and 0.741 seconds, respectively.³

Association reaction times The subject may be asked to speak a word in response to a cue, and in this case the response may be picked up by a microphone attached to the recording apparatus. If, for example, he is required to read aloud the names of words or letters that are exposed, his RT's are in the neighborhood of 0.40 seconds. Although, in this case, he cannot prepare his reaction in advance—and this might lead us to expect long RT's—the reactions are well-practised. The influence of practice has been reported in studies of the choice reaction. When, for example, subjects were told to react to the shock delivered to the wrist but not to the shock delivered to the finger tip, the initial RT's of 0.248 fell to 0.152 after a few hours of practice.

Naming a color or an object requires longer intervals than reading the color names or the object names. The latter process (reading the names) yields RT's of 0.360; the former, 0.560. Calling out the number, when groups of dots are exposed, requires larger intervals as the number increases. One dot requires 0.424 seconds, five dots, 0.636; ten dots, 1.124 seconds.⁴

If the subject is instructed to respond to the presented word with *any other word* that comes to mind, his RT's will average between 1.10 and 2.00 seconds.

The reaction-time data suggest that when we can get set for a specific response to a specific cue, the latency of the reaction is low. As the cues become varied, complex, indeterminate, and as the number of possible responses increases, the subject is less able to make any preparation; he cannot get set for a precise cue, nor can he prepare a particular response, and the latency of reaction is high.

SET AS A DETERMINING FACTOR IN PERCEIVING

The expectant attitude has a dual effect, facilitating the entry of certain stimuli and inhibiting or blocking others. As we have just observed, the set affects the latency of a response. It follows, therefore, that when two or more stimuli fall upon our receptors at the same time, the one for which we are prepared has an advantage and gains prior entry. Once the response to this stimulus is underway, the other contradictory responses are blocked. We cannot both flex and extend our limbs at the same time, look up *and* down, turn right *and* left. Since we have but one set of muscles to respond with, when these are already in use, those stimuli that call for responses congruent with the action systems already in motion will have an advantage. And the blocking of the responses that would require a radical shift in the action-system involves a suppression of the awareness of the cues for these responses. Paying close attention to one group of stimuli means, therefore, keeping the receptors trained upon them, maintaining an expectant posture, keeping the response system available for the reactions that will be required. It also means turning away from other fields of stimulation and maintaining a posture and a reaction-readiness that will make it difficult for other reactions to arise.

Everyday observation yields many illustrations. In the heat of the boyhood brawl when we were intent upon thrashing our opponent we did not notice the skin abrasion that would have undoubtedly caught our attention at other times. Preoccupied with the evening paper we fail to hear the summons to dinner. Slightly embarrassed at the moment of introduction and attending to the gestures and facial expression of the stranger before us, we find to our chagrin, a moment later, that we did not hear the name.

Two Illustrations from the Laboratory

One widely used method of studying perceptual responses involves the use of the *tachistoscope*, a device for exposing visual materials for any desired length of time (usually for a tenth of a second or less). As the exposure time is progressively shortened it becomes increasingly difficult for the subject to perceive what is presented; and as he works under these limiting conditions his full attention is required. If his attention wanders, or if he looks for the wrong thing, his responses do not develop. At this threshold of perception the instructions given to the subject can be shown to have measurable effects. Getting set to receive a particular cue may make all the difference between "catching it" or failing altogether. For example, Kulpe found that if the

subject is given the task of *counting* the number of letters or dots his set makes him relatively unresponsive to their colors, and he cannot report the colors as accurately as when he is forewarned ⁵

One investigator has compared the efficiency of report under two "sets" (*Aufgaben*) ⁶ Chapman exposed groups of 4-8 letters and asked his subjects to report (1) the arrangement and location of the letters, (2) the number, or (3) the names of the letters. Under one procedure the subjects were forewarned as to the nature of the report *before* the exposure. Under the other procedure the subject did not know which of the tasks he would have to perform until *after* the exposure. In the indeterminate task, he had to be prepared for all three tasks. Six observers gave results summarized in the table below.

Number of Correct Responses Given When Tasks Are Set up before and after Exposure of Syllables (from Chapman)

TASK	AUFGABE GIVEN BEFORE EXPOSURE	AUFGABE GIVEN AFTER EXPOSURE
Counting	346	305
Locating	207	103
Naming	130	80

Chapman's results show that this dispersal of attention required by the multiple-task-set lowers the efficiency of each task.

Proofreader's Error

One of the tasks of a proofreader is to search for errors in spelling, punctuation, spacing of letters, and the like. When reading copy to detect these mechanical errors, it is important to neglect the meaning. In ordinary reading for meaning the eye executes a series of rapid flights and perchings. In its flight from one fixation to the next no visual impressions are recorded. When, as is usually the case, there are but 3 to 5 fixations to the line, only a limited portion of the print will fall near the center of the field of clear vision. Out of the rapid series of interrupted impressions the smooth flow of meaning has to develop, and when the reader is intent upon getting this meaning he is prone to overlook errors in typesetting and punctuation. To locate the latter he must alter his set, direct the eye movements in different fashion, attend to the letters and punctuation marks *as such*. The number of fixations increases, and many regressions and retracings are added. Novices reading for meaning (and instructed merely to indicate any errors they happen to

detect) catch 54 errors in a test sample. When they read more carefully for the errors their score rises to 70. Experienced proofreaders catch 90.⁷

Experimentally Produced Hallucinations

In the study of sensory thresholds experimenters become sensitized to the importance of anticipatory sets. Working with minimal stimuli they find that as the threshold is approached and it becomes difficult for the subject to discriminate between the minimal stimulus and no stimulus at all, many false responses occur. If we take the subject's words at face value (and if we take his place as subject we can discover the experiences his words really symbolize) it is evident that a person can be very certain that he has experienced an increase in warmth, or has heard a faint click, when, in fact, the normally required physical stimulus has not been present.

If a regular stimulus order is followed over a prolonged series of observations these hallucinatory "sensations" appear more frequently, and in a majority of the subjects. Ellson used a tone of sub-threshold intensity which increased gradually until it was audible. The subjects were instructed to press a key as soon as they heard the tone. A warning light preceded the onset of the sub-threshold tone, and the tone was so controlled that it crossed the auditory threshold approximately 2 seconds after the warning cue. Test trials in which the onset of the tone was delayed were introduced from time to time.⁸

When, on such test trials, the subject gave a false reaction, a reinforcing supraliminal tone always followed. After a series of 60 conditioning trials, 32 out of 40 subjects gave hallucinatory responses, and all but 3 felt *certain* that they had heard the tone. Once established, the hallucinatory responses proved remarkably resistant to extinction, however, when subjects were warned that the tone would be omitted from time to time the hallucinatory responses appeared less frequently and their latency increased. A few of the subjects who discredited the instruction, continued to experience the hallucinatory tone. In his preliminary tests Ellson found that about 20 per cent of his subjects reported the hallucinatory tone. This percentage increased as the series was given repeatedly.

Tests of Suggestibility

In tests of suggestibility, Brown presented his subjects with a series of ten bottles filled with liquids. He led his subjects to believe that he was interested in olfactory sensibility. Although each of these test bottles held nothing but distilled water the subjects attempted to find traces of either peppermint, wintergreen, or ethyl alcohol. Having been permitted to smell each of these

standard odors they proceeded to examine the test samples. Ninety percent of his subjects reported hallucinatory odors.⁹

In analogous tests with other stimuli he found that 72 per cent of his subjects reported touch, 78 per cent shock, 60 per cent heat. Brown found wide individual differences in susceptibility to the various tests, but the inter-correlations were so low that no single test appeared to measure a general suggestibility. Women, he found, were slightly more suggestible than men, *in these tests*.

SET AND THE DEVELOPING PERCEPTUAL RESPONSE

Granted that a moving figure has caught our eye, what meaning shall we attach to it? Granted that the stimulus is strong enough to cross our sensory threshold, what kind of response will develop? Again, the factor of set must be considered.

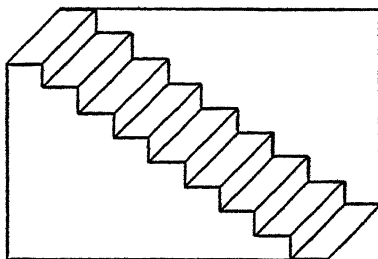
Ambiguous Figures

The ambiguous figure helps us to grasp the nature of our problem. Figure 75 shows a line drawing which we can clearly see; but as we watch it there are sudden transitions. What appeared at first as a flight of steps up which we could climb, suddenly appears to be a drawing of an overhead stairway, seen from below. Back and forth the seen object changes, seemingly out of our control. And the irruption of the *other* figure occurs without our intent, without facilitating set.

If we provide a subject with a double-contact key and ask him to indicate with the key each alternation in the figures, we can make a continuous record of these changes. The oscillations are very irregular, increasing in rate under a condition of steady scrutiny. With some experience the subject can exercise a measure of control over the shifting. For example, by intending that a certain point on the figure will appear nearer, or by filling in imaginary details to enrich and vary the content of what is observed, he can hold one of the phases for a longer period. In this latter instance, for example, he could imagine, "The plaster on the underside of the overhanging staircase is peeling. It needs repair. There is dirt in the far corner. The lower step in the figure looks narrower." The observer can also speed up the oscillations by shifting the point of fixation until as many as 72 oscillations per minute are recorded.¹⁰

The subject soon discovers, however, that there is a limit to this type of

FIGURE 75. An ambiguous figure—flight of steps.



control. Even as he elaborates the imaginary details, the overhead staircase “flops” and he finds himself fixating the tread of one of the steps in an ascending flight of stairs; and the limitation in his ability to shift the figure more and more rapidly demonstrates that the process has an inertia, a certain stickiness. Though he can shift the key-position much more rapidly, and though his intent presses ahead of the process, the actual shifting seems to wait upon other controls. It is as though some inhibitory process had to weaken the figure to the point where the set-to-shift could interrupt what was going on.*

If figures of this type are placed in a tachistoscope and given brief exposures, the subject can also do something to control which of the two perceptual reactions will develop first. The sets we bring with us facilitate definite percepts

Reflections upon the ambiguous figures Studies of ambiguous figures suggest certain considerations:

One. These experiments indicate that the percept is a joint creation of the perceiver and the stimulus field. The perceiver, even as he senses “something out there” adds an interpretation. As the ambiguous figure suggests, now this, now that object, it seems to change in appearance before our eyes. Reason assures us that it is we who have changed. The shifts are within *us*. Less sophisticated observers (child, primitive) are ready to believe that some magic is in the picture. *It* has changed.

Two. The objects we meet in our everyday living are also ambiguous. The same presentation can therefore give rise to alternate percepts as we meet it in different contexts, approach it with different sets. The just-preceding acts, still echoing and perseverating within us, the action-context within which the presentation falls, form a background which helps to determine the percept that forms.

* Under persistent effort to shift the figure as rapidly as possible the rate of shifting slows from 72 to 60 after about 5 minutes. Here the *shifting* seems to be “fatigued.”

Three. There are distinct limits to the powers of the subjective set. In spite of any attempt to *hold* one of the percepts the other intrudes itself. The response systems have their own properties and persist or shift in spite of expectancy, set, intent, interest.

Four. The total process is exceedingly complex. Even while we are aware that one of the figures is dominant in perception, our *thought* may be preoccupied with the other phase (just as we could think of the other side of a medal while looking at the one). And while our attention is held by some detail of the ascending staircase the other aspect of the figure intrudes. In these cases we get the impression of an automatically shifting group of responses with a surrounding and superimposed pattern of marginal responses. (And *we*, the observer, seem to belong to that fringe, watching a process that moves according to its own laws.)

Set in a Series of Judgments

We have seen how a state of expectancy influences the percepts of a subject. In the cases reported there was a conscious attempt to control this factor. Mowrer used a regular 12-second interval to build up expectancy; Ellson also used regular intervals, and in the studies of Chapman the *Aufgaben* directed the attention of the subjects.

Warned by the findings of such investigations, experimenters who seek to measure the accuracy of the perceiving process have found it necessary to control the order of presentation of stimuli. A simple ascending or descending series would be avoided, for the subject's reaction to the earlier members in an ascending order of stimuli would establish an expectancy that would distort his later judgments.

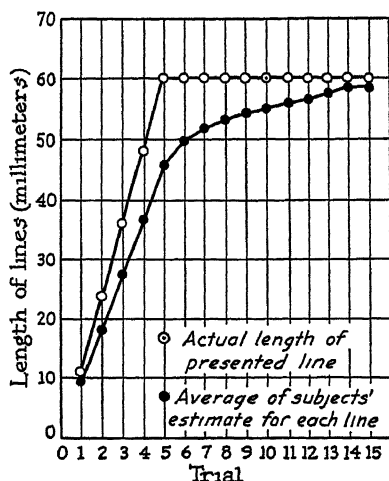


FIGURE 76. The effect of set upon estimates of the length of a series of 15 lines [From Clark L. Hull, *Hypnosis and Suggestibility* (D. Appleton-Century Company, Inc., 1933), p. 358. Used by permission of Appleton-Century-Crofts, Inc.]

Hull and Forster demonstrated such an effect with a series of 15 lines. The lengths of these lines increased gradually up to the fifth member of the series (12, 24, 36, 48, 60 millimeters). Each of the ten stimulus lines which followed was of the same length as the fifth member (60 millimeters). After each line was exposed the subject was told, "I want you to draw a line here which is just as long as the line you see." The measured reproductions (1500) are analyzed graphically in Figure 76, with all the "firsts," "seconds," and so on, of the ten subjects averaged for each plotted point.¹¹

Three trends can be seen: (1) All reproductions tend to be shorter than the exposed lines. (2) A given reproduction is influenced by the just-preceding exposures and reproductions (although the instructions and task do *not* direct the subject to consider these). (3) The trend in errors reverses at the sixth reproduction. By the tenth the error has fallen to 2 per cent of the standard. The "suggestion effect" of the five increasing lengths sets the subject to drawing longer and longer lines.

A central tendency effect A central tendency effect has been shown in studies of hand movements, estimations of length of seen lines, judgments of lifted weights, sound intensities. Hollingworth, for example, found that in judgments of length of lines, varying in length from 50 to 70 millimeters, with an irregular order of exposure, the errors at the extremes are in the direction of the mean length of the series.¹² The 50 millimeter lines are overestimated, the 70 millimeter lines underestimated. When the 70 millimeter lines are made the shortest members of a series ranging from 70 to 250 millimeters, they are overestimated. Within a given series there is an *indifference point* where the overestimation of the shorter lengths passes into the underestimation of the longer ones. At this point the reproductions are divided evenly between overestimations and underestimations. This indifference point is slightly *below* the arithmetical mean of the series of lengths, again indicating a general tendency to underestimate the stimuli.

Paired comparisons A given stimulus may be judged with reference to a standard, as when a series of test weights (96, 98, 100, 102 grams, and so on) are lifted one at a time and each time compared in weight with a standard stimulus of 100 grams. In this procedure the subject first lifts the standard weight and then the test weight, reporting the second weight as heavier, lighter, or the same as the standard. In such paired comparisons the second weight tends to appear heavier than it really is. An impression of *subjective equivalence* will appear if the stimulus presented after the standard is actually *lighter* than the standard. The maximum number of judgments of equality

under these methods, using a 100 gram standard, occurs when the comparison stimulus is 95 grams. This point of subjective equivalence (PSE) can be thrown *above* the standard when the latter is presented *after* the test stimulus.

Errors of this type are also found in comparing two sound intensities, two pitches, two lights. The second sound appears louder, the second pitch appears higher. In the case of the light, however, the PSE is *above* the standard: the second light appears *less* bright. In this case the displacement of the PSE decreases with the passage of time, suggesting that during the interval the resting eye recovers some of its sensitivity. The first light stimulus breaks down chemical substances in the rods and cones of the light-sensitive retina. The products of such a breakdown process stimulate the endings of the optic nerve, providing the actual physiological stimulation for the subject's response; but such a breakdown process leaves the retina momentarily less sensitive. Until the light-sensitive substances are re-synthesized in their original concentrations the same physical intensities of light will produce smaller physiological stimuli. Thus the second light not only *appears* less intense, physiologically, its effect *is* less intense.¹³

Size-weight illusion A familiar example of faulty judgment in estimating the weight of an object provided a clue to a theory of the process of paired comparison that has been widely used, a theory, moreover, which is easily linked with other phenomena of set. If a large, but very light object (such as a block of balsa wood) is compared as to weight with a small, compact object (such as a block of lead) of exactly the same weight, the latter will be judged to be much heavier. Either a visual or tactual impression of size must be given prior to the actual hefting, if the illusion is to appear. If, on the contrary, a subject is blindfolded and then permitted to lift each of the objects by a string, the illusion completely disappears. Apparently, the subject prepares a much larger movement than the balsa block requires; for as he lifts it, it flies up quickly. Conversely, for the lead his preparation is inadequate; the object is heavier than he had anticipated. The hypothesis runs, therefore, that the judgment "heavy" is relative to a subjective standard (preparatory posture) aroused by the visual appearance of the object.

On the basis of such an analysis we could say that in the paired comparisons in which a test weight is compared with a standard weight, the test weight *seems* heavier because the weight-lifting adjustment made for it is less than adequate and has to be corrected in the course of the lifting. It is as though the subject, while trying to keep set for a definite weight (the standard) nevertheless allowed his posture to sag. The increase in effort in the course

of lifting is what our experience has long correlated with the judgment "heavier than."

The effect of interpolated stimuli Such a preparatory adjustment can be deflected in either direction by the interpolation of other weights. The lifting of a much heavier weight in the interval between the lifting of the standard and the lifting of the test weight *raises* the PSE, whereas the interpolation of a weight that is lighter than the standard lowers the PSE. Guilford and Park demonstrated these relationships using a 200 gram standard.¹⁴ Between the standard and the test weight, at the mid-point of a seven second interval, three different weights were lifted (100, 200, 400 grams). The PSE's for these three conditions were 188.2, 192.5, and 199.2 grams, respectively. Similar results have been reported for tones.

SET AS A SUBJECTIVE STANDARD

Instead of presenting standard stimuli for each comparison the experimenter may train his subject to identify each stimulus in terms of an "absolute" scale. In this case the PSE behaves as would be predicted from the central tendency hypothesis.¹⁵ Although the subject attempts to "hold in mind" the standard, as given, his set drifts toward the central position of the series. Thus, with the loudest tones the pull is toward a weaker intensity, with the weaker tones toward a greater intensity, no matter what the standard or the scale. Even in a series of paired comparisons this central-tendency-standard develops.

When we move out from the lab to the conditions of our everyday adjustment it will seem natural to think of the individual as carrying a fairly constant background of expectancy. Against such a subjective standard each stimulating condition will be placed. The city dweller who descends at the rural station and turns from his departing train to a small-town Main Street is struck by the deadly silence. The noise level does not come up to his subjective standard. And the countryman is amazed at the rush of things as he first waits for the subway at 42nd Street. Why is everyone in such a hurry?

For each familiar type of situation, even as we enter, we mobilize a similar set of expectancies; and, *whether we are aware of these or not*, it is against such sets that we declare the cake too dry, the schoolroom too noisy, the hat too small, the colors in the picture too bright. In these instances it is the *contrast*, the required *readjustment*, that both brings the stimulating conditions to our attention and determines our judgment. When the conditions

are "the usual" ones we are prone to neglect them. Even the near-normal gets assimilated to the norm as we deal with it in our habitual way. This is especially true of the differences that are not important, not connected with needs, fears, and the like. Some inkling as to the size of the errors produced by such contrast-effects, misleading sets, may be gained when it is observed that with the balsa wood and the block of lead, 500 grams of lead seem equal to 2500 grams of balsa wood (That is, to the person who is accustomed to the average range of specific gravities.)

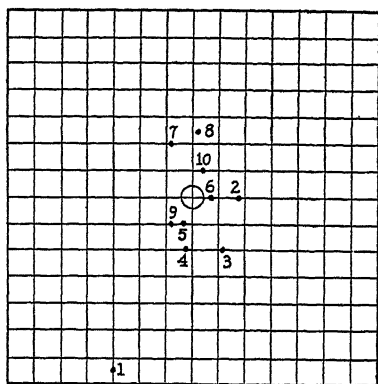


FIGURE 77. Ten localizations on the inner surface of the forearm. The subject was instructed not to correct his judgement once the stylus had touched the skin. The grid used in the experiment has squares 5 millimeters on each side [From L. E. Cole, "Localization of Tactual Space," *Genetic Psychology Monographs*, 5, No. 5 (1929), p. 377.]

The Subjective Standard in Touch Localization

In one of the procedures used in measuring the accuracy of localization of a tactual stimulus a wooden stylus is placed in the right hand of a blind-folded subject. The latter is instructed to indicate the precise location of a spot on his forearm immediately after the experimenter has touched it with a similar stylus. While his right hand is poised a few inches above the inner surface of his left forearm the subject is instructed as follows: "Do not move the stylus once the point touches the surface of the forearm. As soon as I touch the surface of your forearm try to move the tip of your stylus so that it will touch the surface at the same point."¹⁶

As soon as the localizing contact is made the experimenter records it on coordinate paper, a duplicate set of coordinates having been stamped upon the surface of the subject's forearm. Figure 77 shows a record of ten localizations. Note the size of the first error. Although the subject is set for the general area and attentively awaits the stimulus, and although the stimulus is intense enough to be clearly perceptible, the stylus has missed its target by 36 millimeters. The second movement is more accurate and improvement continues throughout the series (see the table below).

Touch Localization Errors under Different Instructions (In millimeters)

INSTRUCTION	TRIALS									
	1	2	3	4	5	6	7	8	9	10
Do not correct once stylus touches surface (70 trials)	21.9	15.9	14.1	10.0	10.9	8.6	7.9	6.0	6.4	5.0
You may correct localizations where possible (60 trials)	10.2	7.8	8.2	10.3	9.8	10.7	11.8	10.7	9.2	9.0
Make localizations on glass plate placing point of stylus as near stimulated point as you can (420 trials)	20.5	24.3	28.8	29.8	27.0	30.3	25.5	27.0	24.3	24.8

Stimuli were presented in series of 10. Each figure after the first "Instruction" represents averages for 7 localizations; each figure after the second "Instruction" represents averages for 6, each figure after the third, averages for 42. Table from L. E. Cole, *General Psychology* (McGraw-Hill Book Company, Inc., 1939), p. 460.

Uncorrected sets: localization without knowledge of results Under the "do not correct" type of instruction the localizer is like a marksman shooting at the target. He has to do his correcting in the next shot. Thus a readjustment of the aiming and localizing is initiated by his felt error. Though the tactual cue is not as good a basis of correction as that provided by a visual target, the error in movement has been large enough to be felt as "too far toward the wrist" (or "too far to the right") and the subject promptly corrects his aim. Thus the correction adjustment provides the basic posture from which the next localizing movement springs.

When this sensory basis of correction is removed the localizing movements do not improve. If a glass plate, stamped with coordinates like those upon the inner surface of the forearm, is inserted above the target just before the stylus reaches the surface, the subject will have no knowledge of the accuracy of his movement. His average errors remain at the level of those made on the first trial of the "do not correct" series (about 20 to 25 millimeters, see the table on page 437). Practice does not improve accuracy.

When he is permitted to correct his localization, and the stylus is now allowed to touch the target surface (see the table on page 437) the error on the first trial under new instructions drops to 10.2. In one sense the subject "knows" more about the location of the target than he is able to show in his uncorrected localization. He retains a subjective set, or standard, against which the second reaction-to-touch can be compared. The response, "too far down," arises immediately as the second touch falls upon this stored impression, just as in the lifted-weight experience the second weight feels heavier or lighter immediately upon being lifted against the background of the stored impression made by the preceding weight. As in the weight comparison there are constant errors in the localization experiment. This constant error has two components. In the first place there is a threshold area within which points successively touched cannot be discriminated. Subjectively they are the same; objectively they may be 10 millimeters apart. Different skin areas have widely different two-point thresholds of this sort. At the sensitive tips of our fingers, or on the lips, the points need to be separated but a millimeter or two. In the middle of the back they must be 20 to 40 millimeters apart before they can be discriminated. Just how much the difference in two-point thresholds is a matter of long practice of the area and how much of it is determined by the distribution of nerve endings, has been a matter of dispute; but the present evidence seems to indicate that if practice has had an influence upon these thresholds, the amount of additional practice required to improve the accuracy of discrimination must be very great indeed. As many as 5000 trials do not bring the thresholds below that which can be obtained in 10 trials.

A second component in the error is a wristward tendency which throws the center of this area below the target. The point of subjective equivalence (PSE) has drifted toward the wrist in the interval between the first and second stimuli. Figure 77 shows, for example, that there are five localizations below the target, and three above. When we locate the center of the distribution of errors it is commonly found some five millimeters to the wristward from the target point.

Another way of indicating the complex character of the set, or the sub-

jective standard, is to ask the subject to give a verbal report or to locate the spot touched upon a photograph or life-size drawing of the surface. Again, it will appear that the subject "knows" more about the location of the target spot than he can reveal in any pointing reaction. If we touch the tip of his little finger he can name the spot correctly or, better still, locate it on a photograph of the area with great accuracy. His accuracy in the middle of the forearm is not much better than his pointing ability. In these procedures the set, the knowledge of the fact that the little finger of the left hand is the target, serves only as a rough guide for the movement. It can pull the head and eyes and hand toward the target, but only with a rough accuracy. The subject will do as well on the forearm as on the finger tip if the glass-plate method is used. Though he knows that he has been touched on the finger tip, his localizing hand has lost the finger tip. This kind of error can be exaggerated if the blindfolded subject is touched upon the forearm and then the experimenter lifts the relaxed arm, swings it far to the left and then returns it to within a few inches of its former position. Although the subject has felt the pull on the skin surfaces at the shoulder joint, and the pull upon tendon and muscles as they were stretched—for muscles, tendons, and joints are richly supplied with sensory nerve endings which report every change of position and tension in a member—the cues provided by these sensory nerves seem to give only rough indications of locality. Once the subject has made a few exploratory touches and has found the surface again, he can move promptly to the target. But such accurate orientation requires constant correction and readjustment. The moment we slip the glass plate between the surface and the tip of the stylus, removing the checkup phase of the process, the localizing hand grows progressively less accurate (note the trend of the errors tabulated on page 437).

And so it is for wider fields. We get out of touch with a situation when we are removed from the day-to-day, first hand contacts. We lack the "feels," the correcting visual cues, that must constantly correct and redirect the sets. The virtuoso needs his keyboard practice, the politician must periodically return to mend his fences and place his "ear to the ground." The student returns home, for vacation, shocked to discover that his subjective standard has shifted. The interpolated adjustments to the tempo of collegiate life, to his age peers, to the demands of his studies, have built in new sets against whose background all of his perceptions now emerge somewhat altered. It is not merely new factual knowledge that he has acquired. It is not merely that he has been doing a great deal of re-learning of attitudes toward the home folks. As a matter of fact they have scarcely entered into his thoughts for months. If anything, he would have said, they are the same as ever. But

from the moment he steps from the platform in his home town he is aware that something *within him* has shifted.

The Effect of Verbally Induced Sets upon the Perception of Figures

We cannot directly inspect the perceptions of another person. We can ask, "How does it look?", or simply, "What do you see?"; or we can ask him to make a drawing that will indicate to us something of what he saw. In either case we do not get the perceptual response itself: his words may lack precision and his skill in drawing may not be adequate to the task. And since both percept and set change as soon as the orienting cues are withdrawn we introduce the possibility of some distortion with every second of delay. But if we simplify the figures and ask for an immediate reproduction we may consider the subject's drawings a reasonably accurate index of what was perceived.
















Repro- duced figures	Word list I	Stimulus figures	Word list II	Repro- duced figures
	Curtains in a window		Diamond in a rectangle	
	Crescent moon		Letter "C" →	
	Eye glasses		Dumb- bells →	
	Pine tree		Trowel →	
	Gun		Broom →	

FIGURE 78. Examples of stimulus figures, suggested object-names, and reproduced figures, which conformed to the name in the Word-list [Based on Crafts et al., *Recent Experiments in Psychology* (McGraw-Hill Book Company, Inc., 1938), p. 340.]

Carmichael, Hogan, and Walter exposed a series of 12 simple but ambiguous line drawings to their subjects (see Figure 78). Before each figure was shown the experimenter announced, "The next figure resembles a . . ."; and one of two alternate objects was named. For one group of subjects the descriptions in word-list I were used, for a second group the descriptions in word list II. The figures themselves were sufficiently ambiguous to be accepted by the subjects as rough approximations of the objects named. At the end of the exposures the subject was asked to reproduce the figures that had been presented.¹⁷

The examples shown in Figure 78 indicate that the reproductions have been distorted in the direction of the verbally induced sets. The experimenters classified the reproductions into five categories, the first classi-

fication being composed of those that were "approximately perfect," and the fifth consisting of drawings "almost completely changed from the original (distorted, inverted, or scarcely recognizable)." Of 3495 drawings, 905 fell in this fifth category, and of this group 74 per cent were judged to resemble the object named to a greater degree than did the stimulus figure actually presented.

In a control group in which no verbal suggestions were given the poorest reproductions (the fifth category) also showed drawings that resembled one or the other of the named objects, but to a lesser degree (45 per cent). In this case the standard toward which the reproductions drifted was supplied by the subject himself out of his own background of experience, since the experimenters did not use the object-names in this case.

In categories I-IV, in which there was greater accuracy of reproduction, the experimenters report that the verbally induced sets operated in the expected direction but in a weaker fashion.

A comparable form of verbally induced change in perceptual responses was studied by Zangwill, who used a series of inkblots. He gave some of his subjects the task of finding animals in one series of blots; and then in a second series they were asked to try to find bits of mountain scenery. One of the blots of the first series was inserted in this second series. Although their attempts to draw what they saw forced them to study the blots closely, 64 per cent of the subjects did not recognize the presence of the familiar blot. The new set induced by the directions, the changed purpose, had altered the appearance of the blot. Instructed in another section of the experiment to look for either animals or mountain scenery in both groups of blots, 90 per cent of the subjects recognized the familiar inserted blot.¹⁸

The demonstration of the influence of set upon the perceiving process should not blind us to the fact that there are main trends which persist in spite of the verbal instructions, an accuracy in recording impressions in spite of the deflecting influence of instructions. It was in the 25 per cent of the drawings that were poorly seen that Carmichael and his associates found the pronounced trend in the suggested direction. Although Zangwill's figures indicate a much more pronounced influence of set, it is worth noting that he used the amorphous inkblot, which is not easy to perceive accurately, or to recognize, under any circumstances.

The Decay of Visually Perceived Designs

In the analysis of various forms of paired comparisons it has been found that the percept of tone or weight or touch cannot be "held in mind" unchanged for any period of time. Within a fraction of a second it has shifted,

measurably, and the amount of displacement increases with time. The direction of drift is toward the center of distribution of the range of cues used in an experiment. Everyday living likewise generates norms which influence judgment, recall, recognition. We are ready to react to a probable state of affairs.

Wulf had suggested that other principles appear as one observes the course of decay of percepts of figures. When his data and interpretations are studied, however, many of the facts conform equally well to the central tendency hypothesis. Wulf had begun his study of the problem using ink-drawings on white cards. Exposing these drawings singly for from 5 to 10 seconds (depending upon the complexity of the figure) he then asked the subject not to think of the figures for a period of 30 seconds. Then the subject attempted to reproduce the figure, and again a day later, and a week later, further reproductions were called for. According to Wulf the reproduced figures showed a *sharpening*, or a *levelling*. In the former case, some aspect of the figure was exaggerated, some effect heightened. Some of the exaggerations were classified as "changes in the direction of some familiar object or relationship."

A second, and to Wulf much more important factor, in the *sharpening* process, is the *emphasis* which—according to the subjects' verbal reports—had been originally given to some aspect of the figure at the time of observation. The structure had been seen as *different from* the norm, the part appeared *unusually* long, or high, and so on. But here, again, it would seem that the obvious principle to invoke is that of contrast with the subjective standard, the habit-based norm which experience with other figures has already established. It is not some inherent quality of the giraffe's figure that leads us to emphasize and exaggerate his neck, but rather the contrast between giraffe-necks and the necks of the other species we know. It is such a shock of change that gave us the size-weight illusion in which the pound of lead seems five times as heavy as the pound of balsa wood. But again we are within the framework of the "central tendency hypothesis."

The reproduced figures tend to be more symmetrical, more "balanced" than the observed ones, Wulf noted. This, too, could be related to a body of experience, to the balance of human constructions in a gravitational field, to conventions in the arts, to experience with geometrical forms. Wulf's own preferred explanation of these changes was in terms of inherent dynamic properties of the figures. Under the pressure of forces from the stimulating field—the argument runs—a perceptual process is set up within us. If we conceive of the *form* of this internal process as having its own internal stresses, as in equilibrium with the incoming stream of nervous excitation,

the moment the pressure of the stimulating field is withdrawn a redistribution of forces will occur. It is analogous to the return of the toy balloon to a spherical shape when the pressure of a finger is released. The redistribution will continue until a more stable shape, an equilibrium of forces, occurs.¹⁹

This type of "principle" does not prove too helpful when we try to predict the trend of events. It is a simple matter to classify, after the fact, whatever data we find, describing the individual reproduction as a case of sharpening, levelling, assimilation to a familiar object, contrast with a familiar object, emphasis. And the principle of autonomy, or dynamic-self-distribution is sufficiently abstract and elastic so that we could include, under this head, all of the categories of changes. We need quantitative data and a more precise formulation of limiting conditions.

Gibson repeated the Wulf experiments with some improvements in procedure.²⁰ The main portion of his study utilized two sets of figures, the first consisting of straight-line drawings, the second of figures with curved sides.

Stimulus figure	<u>Subject's reproduction</u> Object named			
	 <i>Staircase</i>	 <i>Ship's ventilator</i>	 <i>Stairs</i>	 <i>Steps</i>
	 <i>Pyramid with top</i>	 <i>Axe</i>	 <i>Anvil</i>	 <i>Bell</i>
	 <i>Woman's torso</i>	 <i>Footprint on the sands of time</i>	 <i>Dumbbell</i>	 <i>Violin</i>
	 <i>Club</i>	 <i>Electric light bulb</i>	 <i>Hairpin</i>	 <i>End of baseball bat with label around it</i>

FIGURE 79. Samples of stimulus figures and subjects' reproductions from Gibson's study. Under each reproduction is the name given it by the subject. [From Gibson, pp 15 and 19.²⁰]

A series of fourteen figures was shown to the subject before he was asked to reproduce any of them, exposures lasting 1½ to 2 seconds. Gibson found that one of his experimental groups produced 689 figures, 294 of which showed changes that could be classified in the following five categories:

1. *Resemblance to familiar objects* (95). Reproductions resembled objects with which the figure was identified more than figure itself. Here the subject's own verbalizations did for him what the instructions did in the Carmichael, Hogan and Walter experiment (see page 440).
2. *Conformity to verbal analysis* (17). Here a verbal formula, pronounced at the time of exposure, was retained. The figure, forgotten, was replaced by another which nevertheless fulfilled the verbal formula.
3. *Figure assimilation* (108). Here the subject confuses his figure with another in the list. Occasionally composites were formed.
4. *Closure* (48). Gaps in the exposed figure were often closed. This occurred in such a way as to complete an incomplete figure in 15 per cent of the instances in which opportunity for such completion was given. Partial closure was very common.
5. *Disintegration* (26). Gaps were increased and figures separated.

The majority of the changes classified by Gibson seem to be capable of interpretation under a broad principle of *object assimilation*. Under this principle the process of perceiving the visual figures is viewed as a process of apprehending, grasping, organizing. The subject does something to the figure, classifies it, identifies it as similar to or different from a familiar form or just-seen figure; or he breaks it into parts, identifying the latter in terms of familiar categories. The perceiver sees, in short, with his habit systems. The constellation of processes aroused by the stimulus figures behave as one whole, fading out as a whole and being revived as a whole. But in this process of fadeout and revival the more stable parts, the old and the familiar, survive best of all, warping the weaker elements into their orbits. The figure that is seen as like (but not identical with) an electric light bulb is reproduced in a drawing that resembles the light bulb even more than the stimulus figure did. (In one instance lines to represent the filament of the light bulb were *added*.) It moves toward the object that was suggested. Both Gibson and Wulf found evidence that this movement was greater when the interval between exposure and test was increased.

Under this analysis the dynamic quality of the structure is minimized. The data suggest that it is not some general "sharpening or levelling" tendency that controls the process; but the body of experience, particularly

that portion of experience that is mobilized by the figure. If the "peak-ness" of the mountain peak is suggested by a less sharply pointed figure, it is this suggested peak that will "attract" the trace. Another and different object will "flatten it."

A second factor, the *emphasis* given to some aspect of the figure at the time of observation, can be understood as a case of contrast with the subjective standard, the habit-based norm which experience with other figures has already established.

SET AND THE MORE REMOTE PAST

Two principles have been repeatedly emphasized in studies of the perception of visual forms: (1) Whatever operates to obscure the cue or to weaken the process of recall will permit the distorting effect of set to operate more freely; and (2) cues that are obscure or ambiguous arouse an expectancy for the familiar. These principles may be further illustrated by Bartlett's experiments.²¹

Bartlett's Experiments

Pictures were exposed in a tachistoscope, with such short exposure times (0.07 to 0.25 seconds) that the barest glimpse was possible. Subjects were permitted as many as 30 to 40 of these glimpses if they so requested, and they were asked to identify the content of the picture as accurately as possible. Working thus at the margin of the area where perceptions are possible two things became evident: (1) the subjects were doing a great deal of "filling in" from their own remote past, and (2) once they had declared themselves, it became very difficult for them to see anything different. For example, the very first exposure of a harbor scene ("Margate Lifeboat on the Slips") reminded one subject so vividly of his own home that after the 18th exposure he told the experimenter, "It is no use going on. All the time I am getting a suggestion of the docks at home. And *they* are what I see, not the picture in front of me."

And the first of the two principles is illustrated by the wide variety of interpretations given by different subjects to the same picture. Thus, a certain picture ("Hubert and Arthur," by Yeames) was interpreted by Bartlett's subjects as: a little girl saying her prayers on the other side of her mother's knee, two people wrestling, Othello and Desdemona, the woman taken in adultery, Charles the First and Henrietta, and the like. In some instances the subject was quite conscious of a definite frame of reference to which the

picture was being related. In other instances he was quite unaware of the sources in his past from which the present construction arose. He simply saw it "out there."

The effect of delay The moment delays are introduced between exposure and reproduction and recall, the degree of distortion is enhanced. As in the comparison of weights, lines, sounds, the stored percept gradually changes. In one procedure Bartlett permitted his subjects to study a series of pictures of men in uniforms of the armed forces. In this case there was ample time to develop a complete and accurate perceptual response, correcting most of the subjective distortion against the presented cues. In delayed recall his subjects seemed to possess a clear and detailed impression, and in verbal reports would emphasize the square face, the determined serious mien, and so on. And yet when the experimenter showed the subject the original card following such a complete report, a subject would sometimes reject it with the statement, "That's not *my* captain." The captain in the picture, the subject was certain, had been more serious, his mouth had been firmer, his chin more prominent. In such instances we can only infer the precise nature of the transformation in the subjective standard of comparison. Was the direction of change toward some stereotype, some central tendency that had persisted as a residue of all the captains the subject had met, a kind of conventionalized composite photograph that had arisen from many past perceptual reactions, arising now as a kind of fused expectancy against which the presented cue is compared? Or did this subjective captain answer to some personal need? Or was it influenced by some very particular and intense personal experience? Or was the direction of transformation merely an exaggeration of the perceived dimensions so that a firm mouth becomes firmer, a protruding chin more prominent, a sober countenance more serious? The data do not contain the answer.

Serial reproductions: conventionalization One of Bartlett's procedures served to exaggerate the conventionalizing tendency, proposed above. In this procedure the reproduction of subject A is exposed as a model for subject B, and subject B's reproduction is exposed as a model for subject C. The drawings in Figure 80 show the rapid drift toward the probable, conventional. The procedure has the effect of multiplying a tendency that is constantly at work in each individual.

Equally radical distortions of prose passages occurred, even when each passage was read through twice and the delay between reading and recall did not exceed 30 minutes. An Indian folk tale called "The War of the

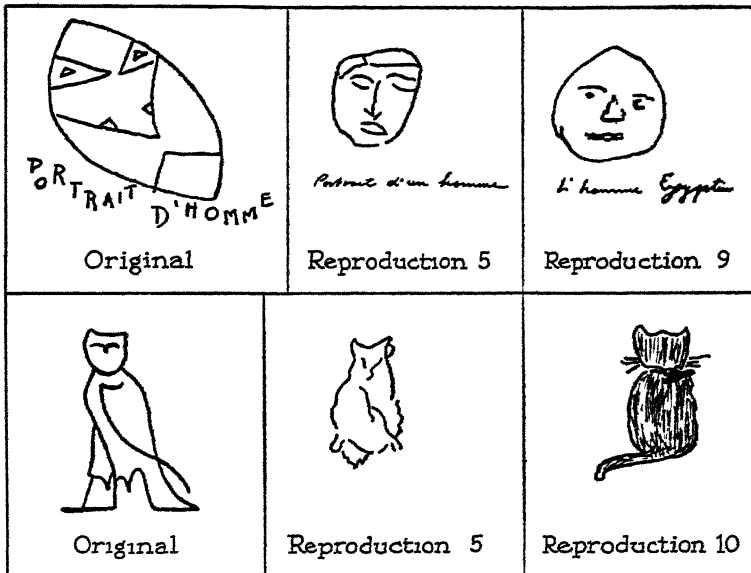


FIGURE 80. Samples from Bartlett's study of conventionalization. Notice that the odd drawing of a human head is straightened up and given conventional features. Lower row: an Egyptian hieroglyphic becomes, on the 10th reproduction, a conventionalized cat. [From F. C. Bartlett, *Remembering* (Cambridge University Press, 1932), pp. 178-181. Used by permission.]

"Ghosts" lost its ghosts in the repeated retelling, and was transformed into a modern British model, even though the title was retained. A passage from Wallace, discussing the effect of geographic isolation upon the modification of species, became an explanation of the absence of snakes and reptiles in Ireland. Apparently the conjunction of the words "Ireland" and reptiles touched off a well-known myth, and the reproduction process was transformed by this subjective factor. The stereotypes and myths we carry, as participants in a culture, appear to operate as a dynamic framework into which new perceptual material is fitted; and in the process of assimilation the received material is worked upon by this framework, and worked over until it fits. Without constant rechecking against an external model the newly stored materials give way to these regnant systems, and in recall they return resembling the older furnishings of our mental garret rather than the recent objects we saw.

We can catch in these experiments a sense of the great change in human thinking that the art of printing introduced. Passed through the group by word of mouth, one man's discoveries and experiences must have been

rapidly reworked into conventional forms. Under such circumstances the novel, the different, the exceptional instance, was bound to die. The wisdom of the tribe acted as a relentless, conservative censor. And an equally conservative tendency must operate in the less articulate groups of men, today. Unable to fix and record their experiences with precision, the latter must undergo a constant transformation toward the conventional. The tyranny of the few stereotypes and myths such men do possess, the paucity of forms they can summon to expression, together with the constant operation of the social facilitation supplied by the proximate group of peers, prevent the individual instances, the unique data, from contributing their due share to the central tendency. The perceptual powers of the group as a whole are thereby weakened. The tyranny of the norm gives a premature mortality to all that is the least bit different. Because the exception, which could improve the rule, is thus lost, there is an intellectual stagnation in such societies, and within them men secure a consensual validation for percepts and beliefs which the total mass of experience within the group should be able to deny. Our irreconcilables, as James once called them, should be our proudest products. Thanks to our machinery of recording we can add their insights to the societal fund of wisdom, and we can preserve their percepts against the flattening force of the lowest common denominator.

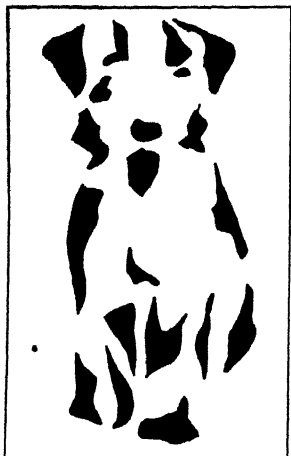


FIGURE 81. A fragmented figure, used in Leeper's study. [From R. F. Street, "A Gestalt Completion Test: A Study of a Cross-section of Intellect," *Teachers College Contributions to Education*, No. 481 (Bureau of Publications, Teachers College, Columbia University, 1931). Used by permission.]

A Study of "Sensory Organization"

Using fragmented and ambiguous visual figures as his experimental materials, Leeper was able to demonstrate the influence of a more remote past upon his subject's perceptions. A series of 19 fragmented figures such as

the one shown in Figure 81 was exposed to subjects on three successive occasions. On the first exposures they were allowed as long as three minutes to name the object represented. Even with this length of exposure many subjects could not discover the meaning of the figures. A second exposure showed an increasing number of correct responses within a shorter exposure period. A third exposure of but one-second duration was given 22 to 25 days after the second exposure; and out of 930 cases where there had been a prior identification of the figure on the first two tests it was recognized in all but 3 per cent of the cases on this delayed test. A control group which had not had the advantage of the previous training series made a poorer showing. In one experimental group, Leeper was able to show that verbally induced sets facilitated the perception of the correct figure; for example, identifying Figure 81 as "an animal" produced a higher percentage of correct responses.

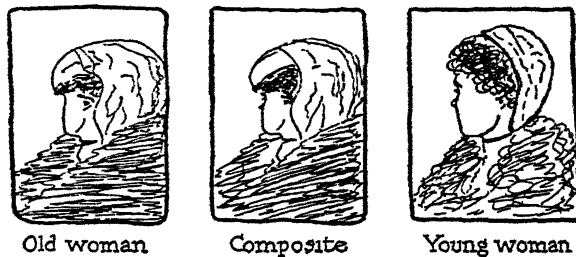


FIGURE 82. Figures used in Leeper's second experiment. Center: ambiguous figure. Left: old-woman characteristics exaggerated. Right: young woman. [From E. G. Boring, "A New Ambiguous Figure," *American Journal of Psychology*, 42 (1930), p. 444.]

In a second experiment he used ambiguous figures such as the drawing of "My wife and my mother-in-law" (Figure 82). The majority of the subjects who were shown this figure without visual or verbal preparation saw the young woman (65 per cent); but when a drawing exaggerating the "old woman" characteristics (such as the one on the left of Figure 82) had been shown beforehand, only 3 per cent saw the young woman. When groups were shown the right hand figure first, *all* of the subjects reported seeing the young woman in the composite picture. As with the fragmented figures Leeper ran a delayed test after a two weeks period had elapsed. The figures were unexpectedly presented in the course of a series of slides that were being used in a class lecture on types of feeble-mindedness. The subjects had been given no warning that the test pictures would appear, and the exposure lasted

but a second. Nevertheless, all but one of the nineteen subjects reported that he had seen the same figure that he had identified in the tests given two weeks previously.

From the verbal reports of the subjects an aspect of the perceiving, attending problem, commented on before, finds fresh confirmation. A subject having selected the "young woman" as a way of structuring the presented figure was nevertheless troubled by some of the items of the figure. The young woman seemed to have a gash in the neck. But this detail, which did not fit in with the whole, though noted, was rejected; and the contrary figure into which it would have fitted easily did *not* arise. Thus, a detail can be fixated upon, reacted to, but rejected because of the dominant response pattern that forms its frame or background. Similarly the part of the figure that forms the young woman's eyelash was diagnosed as a wart on the old woman's nose. Another subject called the "gash" a necklace. These responses indicate a certain stickiness, a stubbornness, in the figure. Organized in a certain way, the cues repeatedly give rise to the same perceptual response after a considerable lapse of time.²²

Whether we refer to these recurrent organizations as "habits of sensory organization" (as Leeper prefers) or simply as habitual ways of perceiving, the facts indicate that a considerable weight must be attached to an inertia factor. For whatever reasons a particular organization was originally made, the trace of this organization operates over long periods and predisposes the subject to organize objectively similar (but different) fields into the mold.

Moods, Considered as Sets

Throughout our treatment of set we have looked upon the perceiver almost as a machine, as though he were a pure intelligence, lifting, comparing, judging, listening; and we have evaluated the effects of the just-preceding stimuli (instructions, interpolated cues) in terms of the accuracy, or truth, of the subsequently formed percepts. This highly over-intellectualized conception of perceiving is, in part, the product of laboratory limitations; stimulus-response relationships of this type are so much simpler to control, record, and quantify. But we would do well to remind ourselves that experience can deliver hammer blows whose reverberations persist far beyond those brief limits usually studied in the laboratory, blows whose after-effects introduce profound and lasting distortions in the field to which the perceiver adjusts.

The emotion-invoking situation is ideally suited to demonstrate this latter case; for the bodily reverberation that sets the endocrines secreting, checks digestion, alters the tonus of smooth muscles, leaves a visible, tangible,

measurable residue in our tissues. Cannon found, for example, measurable quantities of adrenalin in the bloodstream of his frightened cats some 20 minutes after the barking dog had been removed. Subjective evidence tells us that the "good feeling" induced by the genial compliment persists for hours. The mood created by a pleasant dream lasts into the waking hours, and like an obligato to the melody of our acts plays "mood-music" throughout the day. On the less pleasant side are those tense postures Jacobson found in his anxious patients, persistent and measurable contractions in the back of the neck (giving rise to headaches and fatigue) or those tensions in the abdominal wall and gastrointestinal tract (giving us the sense of "being tied up in knots").²³

These moods do more than merely raise or lower the levels of response. It is not merely that we are jumpy, or complacent, that we over-react, or are unusually sluggish. They contribute a *direction*, they include specific readinesses to respond, and they exercise a selective influence over our perceptions.

We say "all the world loves a lover," exaggerating somewhat; for the embittered old maid finds him extremely silly, a mushy jackass. It would be closer to the fact to say that "the lover loves all the world." The state of expectancy he carries as he approaches that planned meeting place spreads to envelop the passer-by, the grazing herd, the wind-blown trees. It's a good world! It is not merely his judgment of his beloved that we mistrust. His "accent on the positive" is so universal that the shadows that properly belong in his percepts are gone, as though the world were being photographed in too bright light. Perhaps something like a dim realization of the contrast between this "idealization" of existence and the brute facts that are hidden underlies the weeping of the women at the marriage ceremony.

Or, to choose a different example, consider the perceptual task of the biographer. He would like to create a living image of the person, to transform an amorphous collection of letters, speeches, published works, anecdotes, personal reminiscences, into a portrait that almost seems to stir, a portrait moreover that others will judge to be *true*. Consider, however, the position of the biographer who has lived out a great portion of his life in close contact with this personage, who has been deeply involved in his affairs, and who is bound by the closest ties of affection to his subject. What will his biography be like if he undertakes it soon after his subject's death?

"The sudden arrival of bodily death to an active and vivid personality is so stunning and bewildering a thing to his immediate circle, that it seems to change their whole view of the departed. The house where his voice and

step are heard no more, the unused books, the vacant chair, the dropped pen—all this gives a rude shock to affection; but the result too often is that the character of the departed is instantly invested in sacredness and solemnity. It seems irreverent to remember anything absurd or amusing about him; his very gaiety and cheerfulness is as fuel to sorrow. Then the biographer begins his work, and the moment that he writes freely and naturally, touches upon faults or frailties or foibles or tricks or tempers or moods, or above all absurdities, there is a chorus of disapproval. The piety of relatives, which is a real and true thing and must be respected, fires up at the bare idea of the hero being represented in an unjust or irascible or perverse or ridiculous light. Then, too, the roseate light of romance begins to shed its glow over their admiring memories.”*

The “chorus of disapproval” also operates *within* the biographer. When his affection is intense the “absurdities, tempers, and foibles” are not even recalled. Now, in retrospect, “everything is smoothed out, the salient features are softened down, the contrast sacrificed, the proportion lost.”† Here needs have fused with expectancies, and the practical purposes of living enter to shape and deflect our percepts.

Still a third illustration of the perseverating mood is shown by the soldier suffering from shell-shock, or combat-fatigue. Here the very sights and sounds of battle, the pressures that have finally proved more than flesh could bear, continue to go round and round. Like a tune that he cannot get out of his head he hears the screams of the wounded. He scarcely dares to fall asleep; for the very act of relaxing permits the whole scene of battle to return. He awakens from his fitful sleep, shouting, perspiring, weeping, terrified. Throughout the day he is jumpy, jittery, tense. The noise of a door slamming, a book dropping, or the drone of a plane overhead, will set off the full-blown emergency reactions of startle, flight, trembling. Even when the extreme symptoms have subsided there sometimes persists for months an undercurrent of mood which chronically alters his perceptions. He cannot *hold* his attention upon anything for long. His reading is desultory, his interests fragmentary, his confidence is gone. Things look “too big” to him. Instead of “seeing life steadily and seeing it whole” he prefers to look as briefly as possible. He is more comfortable with a fragment, with a superficial contact. He is bored with anything or anyone too serious. The ability to integrate, to unify, to assemble his forces for an attack upon any problem

* A. C. Benson, “The Art of the Biographer,” in *Essays by Divers Hands*, edited by G. K. Chesterton (Transactions of the Royal Society of Literature of the United Kingdom, New Series, Vol. VI, 1926, p. 141).

† *Ibid.*, p. 141.

has been lost. He bears no gunshot wound; it is as if his very ego had been damaged.

Finally, we should remind ourselves that these mood-sets can be re-created, revived. It is not merely the present pressure of battle, the recent death of a relative, or the just-preceding task that has the power to induce these reverberations, which deflect the perceptual task. The slightest cue can activate these old residues left behind by these powerful pressures. It was the clink of a spoon against the chinaware, the flavor of a biscuit dipped in tea, the pressure of paving blocks against the soles of his feet, that set Proust off on a vivid reliving of those earlier and lost memories he celebrated in his *Remembrance of Things Past*. And the clinical evidence persuades us that these reverberations may affect us profoundly without our being aware of the cue that set them off, of their past reference. Indeed it is the ease with which such reverberations are *displaced* upon other objects within our present field that gives them their power to affect our perceptions.

SUMMARY AND EVALUATION

The stimuli that rain down upon our receptors, sending myriads of nervous impulses into our central nervous system, do not play upon an inert structure. The responding system is already in motion. It is not merely the traces of recent events still echoing within the system; the system is a going one, set for definite tasks, awaiting cues for significant consummatory acts. Actually, this going system carries sets superimposed on sets. Some of them are from a distant past, some reach forward toward a broad field reaching beyond the present, some of them are in the nature of recent cues which remind us of some precise local change about to appear, some of them are the vague, perseverating effects of prepotent events (moods of joy, grief, anxiety), and some are the oft-repeated and ever-ready habits of our profession, of our daily lives, habits that give stability to our course and keep us "within the bounds of ordinance." Some of them are need-supported, devoutly-to-be-wished, while others are anxiety-laden and often validated expectancies.

It is into such a going system, such a hierarchy of sets, that the stimuli from the present field fall. The structuring of this field, the grasping of objects, emerges out of the confluence of this stream of stimuli and the complicated, dynamic system of needs, expectancies, and perseverating sets. The amazing thing is that there is any regularity and order in the process, not that errors creep into our perception or that the responses are variable.

In evaluating the studies of the influence of needs and sets two opposed

emphases are possible. Although designed to show the existence of subjective factors, many of the experiments actually demonstrate that our habit systems stand up very well in spite of subjective influences. True, the needs produce measurable increments in the per cent of need-congruent responses (Sanford, Murphy, *et al*) but the effect is strictly limited; and to achieve these effects the setting had to be weakened, obscured. In paired comparisons the sets induced by interpolated stimuli deflect our judgment in predicted directions; but the changes are again relatively slight. We have to go to the rare balsa wood, the case at the extreme of the distribution, the unfamiliar and as yet uncorrected cue. With needs and sets changing from moment to moment the perceiver still manages to keep a reasonably accurate grasp upon the consensually validated world of reality. He still knows "what follows what." The chemist's anger at the laboratory explosion does not lead him to revise Boyle's law; and the shell-shocked soldier does not misinterpret words or underestimate the size and shape of objects in his visual field.

More difficult to demonstrate in the restricted field of the laboratory is that power of these needs and sets to produce changes in the perceiver's gross orientation, in his aspirations and fears, in his desire to approach or to retreat, in his tendencies to *act*. Just as the motivational shift brought about by an injection of prolactin—which induces broodiness in the domestic fowl—converts a nest of eggs from an indifferent affair to a "never-to-be-too-much-sat-upon object," so the soldier's mood has converted his former interests into a source of boredom and anxiety. In these instances it is not so much the percepts, the shapes of immediately presented objects, that have changed, as it is the perceiver's attitude toward them. It is the values assigned to them, the tendencies to approach or to retreat, the meaning and significance of the objects for the future, that have changed.

Yet even as we set up this distinction we realize that it is only partially valid. Consider the biographer. If his hatred of his subject is intense enough, along with his invective there seems to operate a constant selective process, a slighting of those facts that would state the case for the defense, a blackening of the damaging details, a closing of many issues where the evidence is incomplete. The portrait that finally emerges differs radically from that drawn by friendly partisan. Witness the biographies of Mary Baker Eddy written by Sybil Wilbur, on the one hand, and by Dakin or Milmine on the other; they seem to deal with different persons! Only the names, dates, and places of residence are the same. Or witness the biographies of F. D. Roosevelt written by his contemporaries.

As the intensity of the subjective factors increases, and as the clarity and availability of validating evidence declines, gross distortions and suppress-

sions begin to creep in. The more one is a partisan the more it is required to test the facts, accumulate the mountain of supporting evidence, experiment with various organizations of the data, make precise records of the unwelcome and contradictory facts—if perceptions are to be accurate.

Of all the fields where the truth is obscure and distortion is easy, where partisanship runs high, and where clear and decisive evidence is rare, the field of human relationships is the outstanding example. In friendship, politics, and work, we are not aloof observers, recording the motions of impersonal molecules in a space-time manifold. We are partisans, in the midst of a battle, fighting, defending, propagandizing; or we are lovers, petitioning, wooing; or we are frightened men looking for a port in a storm. It is not merely because we lack the leisure in which to seek the validating checks and balances. Frequently we lack the inclination.

And in the midst of such all-out striving we pause, from time to time, to make those forecasts of the future, or to contemplate the political myths of our tribe, the philosophic and artistic conceptions of the nature of man and his destiny, the religious hopes in which we sometimes invest all that this life fails to gratify. We gather in groups, seeking consensual validation through mutual support, shouting the louder to drown out doubt, separating ourselves from those others who do not share our dream. Here no metrical standard marks the flood tide of our hopes as Error. Nor can we wait for the passage of geologic eons before making up our minds. Indecision is itself a decision and creates one kind of reality even as it hesitates.

In this vast field the subjective factors are dominant. Even the "organized nervousness" of science can do no more than caution our wish-laden fantasies against premature closure of vital issues. We close them.

REFERENCES

1. O. H. Mowrer, "Preparatory Set (Expectancy)—Some Methods of Measurement," *Psychological Monographs*, 52, Whole No. 233 (1940), pp. 1-43.
2. J. Merkel, "Die Zeitlichen Verhältnisse der Willemsthatigkeit," *Philosophische Studien*, 2 (1885), pp. 73-127.
3. V. W. Lemmon, "The Relation of Reaction Time to Measures of Intelligence, Memory, and Learning," *Archives of Psychology*, 15, No. 94 (1927).
4. V. von Szelenksi, "Relation between the Quantity Perceived and the Time of Perception," *Journal of Experimental Psychology*, 7 (1924), pp. 135-147.
5. O. Kulpe, "Versuche über Abstraktion," *Bericht über die I. Kongress für Experimentelle Psychologie*. (1904), pp. 56-68.
6. D. W. Chapman, "The Relative Effects of Determinate and Indeterminate Aufgaben," *American Journal of Psychology*, 44 (1932), pp. 73-86.

7. H R Crosland, *Investigation of Proof Readers' Illusions*, University of Oregon Publications, Vol. 2, No. 6 (1924).
8. D. G. Ellson, "Hallucinations Produced by Sensory Conditioning," *Journal of Experimental Psychology*, 28 (1941), pp. 1-20
 ———, "Experimental Extinction of an Hallucination Produced by Sensory Conditioning," *Journal of Experimental Psychology*, 28 (1941), pp. 35-61.
9. Warner Brown, "Individual and Sex Differences in Suggestibility," *University of California Publications in Psychology*, 2, No. 6 (1916), pp. 291-430
10. R. S. Woodworth, *Experimental Psychology* (Henry Holt & Co, Inc, 1938)
11. C. L. Hull and M C Forster, "Habituation and Perseverational Characteristics of Two Forms of Indirect Suggestion," *Journal of Experimental Psychology*, 15 (1932), pp. 700-715
12. H. L. Hollingworth, "The Inadequacy of Movement," *Archives of Psychology* (1909), No. 13
13. Wolfgang Kohler, "Zur Theorie des Sukzessivvergleichs und der Zeitfehler," *Psychologische Forschung*, 4 (1923), pp. 115-175.
 Y Wada, "Der Zeitfehler, beim Sukzessivvergleich der Tonhöhe," *Japanese Journal of Psychology*, 7 (1932), pp. 505-537.
14. J. G. Needham, "Rate of Presentation in the Method of Single Stimuli," *American Journal of Psychology*, 47 (1935), pp. 275-284.
15. J. P. Guilford and D G Park, "The Effect of Interpolated Weights upon Comparative Judgments," *American Journal of Psychology*, 43 (1931), pp. 589-599.
16. O. Lauenstein, "Ansatz zu Einer Physiologischen Theorie des Vergleichs und der Zeitfehler," *Psychologische Forschung*, 17 (1933), pp. 130-177.
17. H J Pearce, "Experimental Observations upon Normal Motor Suggestibility," *Psychological Review*, 9 (1902), pp. 329-356
18. L Carmichael; H P Hogan; and A A. Walter, "An Experimental Study of the Effect of Language on the Reproduction of Visually Perceived Forms," *Journal of Experimental Psychology*, 15 (1932), pp. 73-86
19. O L Zangwill, "A Study of the Significance of Attitude in Recognition," *British Journal of Psychology*, 28 (1937), pp. 12-17.
20. F. Wulf, "Beitrage zur Psychologie der Gestalt VI Ueber die Veränderung von Vorstellungen (Gedachtnis und Gestalt)," *Psychologische Forschung*, 1 (1922), pp. 333-373
21. J J Gibson, "The Reproduction of Visually Perceived Forms," *Journal of Experimental Psychology*, 12 (1929), pp. 1-39
22. F C Bartlett, *Remembering* (Cambridge University Press, 1932).
23. R Leeper, "A Study of a Neglected Portion of the Field of Learning—The Development of Sensory Organization," *Journal of Genetic Psychology*, 46 (1935), pp. 41-75.
24. Edmund Jacobson, *Progressive Relaxation* (University of Chicago Press, 1929).

CHAPTER 14

Localizing Objects in a Field

It has been customary, in the traditional discussions of the perceptual process, to ask the question, "How does the perceptual field get organized?" In part, the question is a fictitious one which has been created by a false analysis of the process of perceiving; in part, it poses genuine problems which are so difficult that our present data and methods of experimentation have not furnished complete answers. Even the bare statement of the problem is somewhat difficult to make, at least in a form that all experimenters can agree upon.

In order to appreciate the nature of the problem it will help to look at the way in which it has been conceived, traditionally. Otherwise we are apt to take so much for granted that we shall remain unaware of the hidden assumptions underlying our approach; for there is a psychology of perception that lies so deeply embedded in our culture that it shapes our thinking even at the outset.

The problem that is raised is as ancient as the question, "How can we know the external world?" And it is tied up with the certainty that while some of our perceptions are true, some are indubitably false. This certainty led very early to the distinction between the world of appearance and the world of reality. One of the earliest expressions of the problem is that given in Plato's allegory of the cave (Book VII of *The Republic*). In symbolic form the philosopher states his view of the predicament of the perceiver. As we examine it certain questions need to be raised lest in accepting it we undertake a search for answers to problems that do not exist.

The Analogy of the Cave

"And now, I said, let me show in a figure how far our nature is enlightened or unenlightened.—Behold! human beings living in an underground den, which has a mouth open towards the light and reaching all along the den, here they have been from their childhood, and have their legs and necks chained so that they cannot move, and can only see before them, being prevented by the chains from turning round their heads. Above and behind them a fire is blazing at a distance, and between the fire and the prisoners there is a raised way; and you will see, if you look, a low wall built along the way, like the screen which marionette players have in front of them, over which they show the puppets.

"I see

"And do you see, I said, men passing along the wall carrying all sorts of vessels, and statues and figures of animals made of wood and stone and various materials, which appear over the wall? Some of them are talking, others silent

"You have shown me a strange image, and they are strange prisoners.

"Like ourselves, I replied; and they see only their own shadows, or the shadows of one another, which the fire throws on the opposite wall of the cave?

"True, he said; how could they see anything but the shadows if they were never allowed to move their heads?

"And of the objects which are being carried in like manner they would only see the shadows?

"Yes, he said.

"And if they were able to converse with one another, would they not suppose that they were naming what was actually before them?

"Very true.

"And suppose further that the prison had an echo which came from the other side, would they not be sure to fancy when one of the passers-by spoke that the voice which they heard came from the passing shadow?

"No question, he replied.

"To them, I said, the truth would be literally nothing but the shadow of the images.

"And now look again, and see what will naturally follow if the prisoners are released and disabused of their error. At first, when any of them is liberated and compelled suddenly to stand up and turn his neck round and walk and look toward the light, he will suffer sharp pains; the glare will distress him, and he will be unable to see the realities of which in his former state he had seen the shadows; and then conceive some one saying to him, that which he saw before was an illusion, but that now, when he is approaching nearer to being and his eye is turned towards more real existence, he has clearer vision,—what will be his reply? And you may further imagine that his instructor is pointing to the objects as they pass and requiring him to name them,—will he not be perplexed? Will he not fancy that the shadows which he formerly saw are truer than the objects which are now shown to him?

"Far truer."*

Most simply stated, the essence of the picture is this: the soul (the perceiving mind or intelligence, or spirit) is a prisoner. Like the prisoners of Plato's cave the soul is in chains, chained to the flesh of the perceiver's body. The eyes of the soul are not able to look out directly upon the real world, the real forms, they see only shadows, reflections. Yet the soul weaves a pattern out of these illusory shadows. As they come and go in somewhat regular sequence, and are accompanied by footfalls and voices, associations tie the shadow to shadow, and the shadows to the sounds. These are associations between appearances, however; the objects themselves are not perceived. There is, to be sure, a certain congruity between the world of reality and the world of appearance—when the real object moves the shadow moves. But there are many instances in which there is a lack of fit; for example, the echo comes to the perceiver from a reflecting wall and he locates it there rather than at its true source.

Now a great deal of the psychology of perception consists in a refinement of the problem that is here presented. Each generation has written its own modification of the allegory as new evidence has come in; and each generation has found aspects of the allegory to puzzle about. For example:

One. Who is this one who writes such an allegory? Is he not one of those in the cave, sitting beside the others, as chained as they are? How can he

* *The Works of Plato*, translated by Benjamin Jowett (Tudor Publishing Co., n.d.), pp. 265-266.

speak of the true objects, any more than they, having served time as prisoner in the flesh from the beginning, even as they? He claims to have escaped from the world of appearance, from the prisonhouse of the flesh, and to have direct revelations about the realm of being of which the shadows are a mere appearance. Let him speak as one of those others, and we shall see the allegory for what it is, a creative leap beyond experience, a set of postulates, a tale to delight and terrify.

Two. Since the vision of reality is something that occurs within a flesh-bound prisoner, the *real* objects are precisely on a par with the appearances reflected from the wall. We thus have two classes of data, appearance A and appearance B, one of which we call reality. The concept of reality appears to be a special sort of appearance. The cave, the shadows, the real objects, the chained perceiver, all these are appearances.

Three The passive character of the perceivers is so far removed from the living subjects we know that it does not seem to be a very fruitful analogy. Would such chained subjects (apart from the question of their physical needs) every develop perceptions? Would the shadows move? Would they be near or far? Would the figures have a shape? And what could these concepts of movement, distance, and shape *mean* to chained subjects? In a world without the act that creates and validates there would be neither significance nor truth in such perceptions.

Four. And where is the cave within which the perceiver dwells? Since the days of Hippocrates the search for the "seat of the soul" has continued. For all our scientific progress we locate the spot much as the Greeks did, in the head. We have new (but equally insufficient) reasons.

The figures of speech have changed in the twenty-odd centuries since Plato; but many of his pseudo-problems remain. The chained ones are no longer thought of as in a cave, though they are in a sense regarded as separated from reality. The perceivers have been studied, rather, as they live and react in a world of physical reality (and this is an assumed or constructed reality) more actively engaging the shadows. But their minds are still viewed as prisoners of the flesh (in the cranium), and more often than not as blank tablets on which experience writes (that is, on which the appearances of things get associated).

Neurological Pseudo-Problems

Plato did not have a great deal of knowledge of the nature of the brain, and of the sense organs. Hence he had little to say about the "messages," the nerve impulses that brought in the impressions from the outer world to

this mind-prisoner, dwelling somewhere in the convolutions of the brain. As our knowledge of the anatomy and physiology of the sense organs increases, and as we try to imagine the problem of our chained prisoner, the perceiver, a new pseudo-problem arises. How do the hundreds of thousands of impulses streaming centralward to the brain ever get organized into patterns-that-mean-objects? How is the perceiver ever able to group together the impressions that belong together, to refer them to outer space to the proper objects that give rise to them? If sensory processes from the eye, the ear, the taste buds, the semicircular canals, the musculature, the skin surfaces, are all rushing centralward at the same time, how do they become an ordered field with a structure? When one conceives of the sense organs, as the physiologist does, as transformers which convert pressures, light-waves, sound-waves, into electro-chemical effects which are carried centralward in the nervous system over one-way conductors in successions of ripples of energy at a rate of 100 meters per second, how can there emerge from such a barrage of electro-chemical waves an ordered pattern? If we could conceive of a recording system that could pick up these changes from the nerves that travel to the brain (and the ripple of change in a single nerve *can* be recorded) and if these electrical effects could be converted through an amplifying system into vibrations in a loud speaker, what a formless aggregate of sound these vibrations would make in *our* ears! Yet in the mind of the perceiver there might transpire such a calmly ordered experience as he might enjoy when reclining in the stern of a sailboat on a sunny afternoon, looking out on the blue waters flecked with whitecaps. How do the myriads of ripples in my nervous system get organized so that I seem to look out on an ordered field, a field so correctly ordered that, when I act upon what I see, I can steer my craft into port?

And when we look at the brain, itself, this "pseudo-problem" becomes even more confusing; for, whereas the perceiving self appears, subjectively, as a unitary being, the brain is a network composed of some 14 billion cells. Millions of them will comprise the occipital area, the receiving station to which the million fibers of the optic nerve and its mid-brain relays carry the impulses that originate in the retinas of the two eyes. The ripples of any single optical fiber can vary in intensity, form, rate of succession. Arriving at the "visual" cells of the cerebral cortex (those cells on the outer rind of the brain whose destruction produces blindness) to which the incoming sensory path is attached, they set up changes which spread over the conduction paths connecting the optical cortical cells with the rest of the brain. When we have analyzed the physiology of seeing into separate cells, separate paths, separate impulses, how shall we ever get them together again? There is

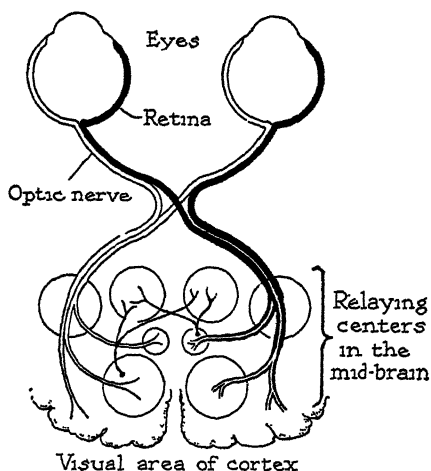


FIGURE 83. Schematic drawing of the pathways and centers involved in vision. Note that the right half of each retina is connected (nerve fibers shown in black) with the right half of the visual area in the cortex, and the left half of each retina with the left part of the visual area.

nothing like blueness or brilliance in these separate physical events. The physiological bits of which the total process is composed do not even contain the bits of green, gray, brown, or the moving bit of buff that the perceiver somehow synthesizes into the "rabbit diving into the berry patch."

Lest the reader feel that we have raised a mere historical oddity to a position of undue prominence, let him attempt the answer to these questions and see whether he can wholly avoid all forms of the cave allegory. Or, let him consider the following account from a twentieth century author:

"But the more prosaic, and yet, after all, more wonderful fact is that the mind receives only indirect reports of what is going on without. The cortex of the brain, with which our consciousness is connected, lies in darkness, deep in its coatings of tough membranes and skull and flesh, and connected with the outer world only through the medium of long and delicate fibers that bring in messages from the outposts of sense. It is as if a person were secluded in an inner chamber and learned of the outside world only by an inconceivably elaborate system of wires and signals. From some difference in the signals accompanying the different messages, or from some peculiarity either of the tone or of the interconnection of the messages themselves, we are able to picture the scene which is causing the influx of sensations. The mind must distinguish the various impressions from different parts of the skin, or from the innumerable points on the surface of the eye, and refer each to its proper place in the external world. When one considers the complexity of the task,—that we can accurately tell not only the direction but also the ever changing distance from which sensations come through the

rods and cones of the eyes,—the ease and security with which this amazing performance is accomplished is one of the marvels of life ”*

This modern example seems to assume that percepts are the work of an imprisoned mind, and that the “sensations” (bits of green, buff, and gray, and the like) are elementary bits of “mind-stuff” fashioned out of the physiological nerve-currents. A double transformation is involved: nerve impulses into sensations, sensations into meaningful percepts. The “rabbit-diving-into-a-berry-patch” is a mind-made concept, then, an added meaning which was not directly given, an organization of the bits determined either by laws of association or by some synthesizing power of the mind; or, perhaps there are forces of attraction and repulsion in the bits, themselves, so that they arrange themselves like charges on a conductor before the soul-spectator. This construction of percepts out of the sensory bits seemed to an earlier generation of psychologists to present problems analogous to those faced by chemists who were seeking to understand compounds as syntheses of atoms, hard bits of matter. It was to the laws of such a mental chemistry that the student of perception once directed his attention.

Mental Chemistry as an Answer to a Pseudo-Problem

Stated in the language of traditional psychology the problem ran. How do the sensory units out of which consciousness is built ever get organized into totalities, fields, patterns, percepts? Like each of the preceding pseudo-problems, the puzzle is created by the original conception of the nature of the perceiving process. An experience in the mind of the perceiver (the argument runs) a total conscious state, can best be understood as composed of two sorts of parts, sensations and images. A sensation is the kind of primary conscious stuff that would arise in the mind of a naive, inexperienced, subject (such as a newborn infant) when his receptors are first stimulated. There are specialized transformers on the body surface (the sense organs) which convert the physical energies coming to them from the outer world into nerve impulses. Each sensory nerve is equipped to carry a single kind of impulse. On the tongue, for example, there are four sorts of receptor endings, four types of taste buds, each type yielding a characteristic sensory quality (either salt, sour, sweet, or bitter). The buds contain hair cells which react to chemical substances in solution, and if a receptor reacts at all, it will yield one and only one type of sensation. The complex tastes that distinguish our various foods are but mixtures of these elementary tastes. In

* G. M. Stratton, *Experimental Psychology and Culture*, pp. 123-124. Copyright 1908 by The Macmillan Company and used with their permission.

addition, some complex experiences, like the hard, chewy "feel" of caramels, or the crunchy, crackly, "sound" of crisp and fresh breakfast food, add mixtures of sound-effects, muscular tension, pressures against the mouth parts, to the taste stimuli proper.

The analysis of percepts into their sensory components was greatly facilitated by advances in anatomy, and the two lines of research (behavioral and anatomical) advanced in parallel. For example, on the skin surface, it was found that certain spots gave sensations of warmth, others gave coolness, pressure, and pain. With the clear isolation of these sharply differentiated spots, the problem for the physiologist and anatomist was to probe the tissues for the specialized endings themselves—that is, warm-endings, cool-endings, pressure-endings, pain-endings.

This, at least, is the way in which many workers defined the problem. The microscopic study of tissues dissected from these sensitive spots has not yielded unequivocal results. The possibility remains that such sensed differences as those between warm and cool, pressure and pain, may depend upon differences in the form and frequency of the waves carried by the sensory nerves. Experiment has shown that in the electrical record of the changes in a sensory nerve the rate of succession of the separate pulses in a train of waves increases as the pressure applied to a pressure-spot increases. The speed of the propagation of the waves along the nerve remains constant but the waves follow one another in more rapid succession. Does an increase in such a rate of succession produce at some point on the continuum a qualitative transformation in the perceiver's experience from pressure to pain? At what point? Over what range? A multitude of similar but as yet unanswered problems has grown out of the various analyses of this problem.

But once psychologists had arrived at the notion of these unitary bits of consciousness, and of the mechanisms that relayed the physically induced receptor changes to the cortical areas, the problem of perception had just begun. It was apparent that a second sort of element was also present in consciousness. There were events in consciousness that did not correspond to the physical changes acting on the separate sensitive endings in the receptor surfaces. For example, the subject in the laboratory continued to hear the faint hiss of an air blast as it grew weaker and weaker. In fact he continued to report it after the air pressure had been cut off. The patient on the ward complained of voices no one else could hear. The subject in the memory experiment reported a visual image of the word-associate that he had memorized, when no visual cue was presented to his retinal surfaces. These "images" were clearly subjective, and were classified as "re-

vived sensations." Their presence was explained by the operation of the association-process, and a law was stated. "When two or more sensations are present in consciousness at the same time, the re-arousal of one leads to the re-arousal of the other." And, following the current anatomical progress which located cells in the optical cortex whose loss resulted in a loss of color sensations, and cells in the auditory area of the brain whose loss resulted in a loss of specific auditory sensations, it was but a step to the notion that the association between the sensations was due to the operation of some in-between process which actually connected the color cell with the sound cell. These in-between impulses had to be inferred since, although they occurred in cortical cells, they never produced any correlated conscious states themselves. It was the revived activity of the sensory cell at the end of the line, and the correlated conscious image the subject experienced, that gave the basis for the inference. Thus psychology had arrived at a notion of a unitary sensory process occurring in a specific cell or group of cells in the cortex of the brain, and at the notion of an image that occurred when the associated cells (previously activated along with the now excited sensory cell) were aroused by the connecting processes.

How did these reverberations in associated cells differ from the sensory process itself? As far as introspection could answer, the images differed merely in clearness, vividness. Operating at a lowered intensity, as compared to the cortical processes directly excited by the present physical stimulus, they gave rise to states of consciousness of greater vagueness, fuzziness. But at the marginal intensities where the capacity to respond reaches its limit (as when the air blast is barely perceptible) the distinction between sensation and image disappeared. The subject could not discriminate.

Thus there were admitted into the field of perception two unitary processes, and two only: (1) the sensory units that arose in consciousness when the nerve impulses originating in the receptor finally stimulated the cortical receiving stations, and (2) the centrally aroused associates of such units, set off by cells previously linked in joint actions. Take away the sensory units, and their associated images, and what is left in the consciousness of the perceiver? Nothing at all. Even the most fantastic products of our imagination, the whiffenpoofs and jabberwocks, were assumed to be simple recombinations of ancient sensory materials.

Leaving aside the embarrassing question as to how the cortical nerve impulses are ever translated into reds and noises—a problem that has never received more than a verbal pseudo-solution—there arose a series of problems. The phenomenal field, the field of awareness, has form and shape. It is no mere aggregate of red-units, shrill-units, pain-units; it is "blood gushing

from a wound and a shrill cry of pain," or more accurately, "My child is hurt!" It is an organized whole. We react to objects with meaning, not to 249,631 sensory units variously classified and catalogued. Moreover, whereas each of the sensory processes begins at the receptor, and the whole chain of events that has occupied our attention occurs within the body of the perceiver, *the objects are sensed as out there*; and we move among them.

Lack of Correspondence between Local Stimuli and Perceived Shapes

Even when we try to get round the problem of shape and organization by affirming that the sensory process has a shape, we become entangled in difficulties. If we take the retina, for example—the sensitive membrane lining the eye and containing the hundreds of thousands of sensitive endings that react to light—it is clear that the shape of the image cast upon its surface is not that of the object that is seen. Let the subject look at a black line on a white background. The mosaic of rods and cones will contain a row of endings now differentially aroused by the light-dark pattern, but the shape of this row of rods and cones is that of a curve, not a straight line. And if there are two retinas, each turned upon the stimulus surface from a slightly different position in space, each having its own differences in the temporal and nasal sides (since the eyeball is not a perfect sphere) then there are two retinal "curves" which are being sensed as one. But the afferent input of stimulation merely begins at the retinas. Racing centralward are the ripples of optical impulses, and a continuous stream of these flows toward the cortical visual cells as long as the subject fixates the same point. When the impulses arrive at the mid-brain relay centers, fresh cells are activated and the impulses proceed to the cells of the cortex lying along the central fissure at the back of the brain. In following this neural pathway to the brain the nerve fibers have conducted the impulses over oddly shaped routes, for the fibers cross, turn in their courses, enter the brain stem at the back, and once more reverse their direction before they arrive at their cortical destination (see Figure 83). Finally they arrive at cortical cells whose spatial distribution differs not only from the shape of the real line but also from the shape of the retinal patterns that initiated the chain of neural activity. There is reason to believe, on anatomical and experimental evidence, that each retinal cell is connected with a particular cortical cell; but there is little correspondence between the actual three-dimensional shape of the beginning and end points of this path. And the whole three-dimensional sensori-neural-cortical pattern that is now active is not shaped like a line at all. Still more confusing, when the experienced subject sees such an object as a black line on a white field, the object retains its shape no matter whether he fixates above it or below it, to the right

or to the left. It is still a straight line. Yet the shapes of the different retinal origins of the stimulus pattern, as well as the locus and shape of the cortical points to which this retinal pattern is connected, are continually changing with each fixation. The "seen object" appears to be a constant thing while the sensory inputs change their shape and locus.

The Natural History of Perceptual Responses

We have repeatedly referred to these problems as "pseudo-problems," and so they are. We have been corrupted by an allegorical tale. We have been puzzling about a fictitious prisoner who does not exist. We have split the objects and shapes of the real world into artificial parts which never operate as such separate parts, and we have split the responses into neural ripples and atomistic sensations which never exist or function as such isolated units. It is as though, having discovered that on the dissecting table we can isolate a rod, or a taste bud, we then proceed to raise questions about their isolated functioning in the living organism, when in fact they never function in this fashion. Finally, we have treated the process of perceiving as though it were something occurring in a body (or person) that is wholly passive, resting, chained, as though a passive observer merely looked upon the passing show. There are no such observers.

Instead of the Platonic allegory let us examine a case nearer home. How does the infant's world get organized so that he can perceive and grasp it? When we first hold him up to the world we have to support his back and his head. He sees no roomful of objects. Indeed he cannot even fixate upon one of them. Held in his mother's arms, his head wobbles on its weak and uncoordinated muscular support; the eyes move, to be sure, but with an alarming degree of independence, and they can only be directed or arrested by massive light surfaces, and then only momentarily. The six pairs of muscles that swing his eyes, the muscles that join his head and trunk, the muscles of his legs and arms and hands, are all capable of reacting; but there is little integration and teamwork among them as yet.

If we think of the problem in the light of our analysis of the retinal-cortical problem, we can see that only for the briefest moments will any clear image form on one of the retinas, unless the head is supported; and as he is carried in his mother's arms the streaks and blurs that must stimulate his retinas in confusing successions (as well as the pressures and sounds that act upon his skin and ears at the same time) must indeed make the world, as James imagined, "a buzzing, blooming, confusion." As yet he has no knowledge of "what-follows-what" for it is all new, and no regular successions of events have established the sets for things-to-come. We can imagine a mix-

ture in which auditory, visual, tactual, muscular stimuli arise along with intestinal cramps, pain from freshly exposed respiratory passages, and so on. But our own memory does not reach back that far, and to imagine what the child feels is to project an adult consciousness into what must be a kind of primitive and undifferentiated I-don't-know-what. In the act of imagining the infant's consciousness we are in danger of committing the error of Plato when he stood outside the cave and imagined the perceptual consciousness of his chained observers.

At least we can observe the development of his *behavior*. With maturing postures geared into a world of recurring sequences (by conditioning) he begins to fixate objects with his eyes, and to pursue them (first with lateral, then vertical, and finally with curving paths of movement). But for some time his hands and eyes lead an independent existence. Whereas he can soon grasp an object touching his palm, reflexly, his eye does not focus on the object in his palm; nor when his eye has alighted upon a reflecting surface does he extend his hand to touch the seen object. Is it, indeed, an object? A "something" has caught his eye, to be sure. But is it near, or far? His early reachings, when they do come, are as apt to be directed at the moon as toward his rattle. In the newly hatched chick or the newborn guinea pig the reactions are better integrated. The former stands, even if a bit wobbly, and directs his pecking at the discolored spot on the surface—not too accurately, but with a roughly appropriate adjustment. The latter, delivered by Caesarian section three days prior to full term, gets up from the observation board before he is dry and makes his way across a visual field and *avoids a visual obstacle!*¹ The day-old monkey is ready to climb up the sides of his cage, and the salamander is ready to swim. The human infant is slower to mature, and as he matures habit-factors are woven into the structure of his visual-motor reflexes so that by the time we arrive at locomotion in a field, or by the time eye and hand are functioning together in the pursuit and capture of an object it is difficult to tell which has contributed most to the process, maturation or habit formation.

In any case, sooner or later the moving object in the field produces a to-turning, a grasping, a drawing of the object to the mouth, and a mouthing. Now the hungry child eagerly watches the approach of his bottle, his arms excitedly flap in birdlike gestures until the bottle gets within range of his avid grasp. We see his mouth shaping itself in preparation for the nursing act; and his drooling testifies to the presence of conditioned salivary reflexes, expectancies. The stimuli, the objects that move before him, now have an on-leading character; they mean experiences-to-come, and they arouse re-

sponses adapted to deal with an object in advance of the actual contact with the object. The sound of the preparation of his bottle sets the eyes of the child swinging toward the door through which he expects it to come. As the light rays reflected from the white milk, the bottle, the brown nipple (with its "inviting" shape) fall upon the adjusted retinas of the child, they arouse expectancies, sets, a readiness for the warm, gushing, sweet taste. Such expectancies and anticipatory adjustments are the behavioral aspect of the images with which our theory has been concerned. As we watch the infant's anticipatory postures, the premature nursing movements, it is easy for us to infer parallel inner experiences (for example, an anticipatory "feel" of the nipple). Since the child has no language at this stage, and since we have no adequate recall of the earliest phases of our own development, the imagined parallel experiences are hypothetical, and seemingly incapable of any verification. We can only extrapolate on the basis of our own experience in adult situations (such as those in the laboratory experiment where hallucinations were established). All this implies that the seen world takes on shape, meaning, and order as the responses develop from their confused, interfering, and somewhat dissociated beginnings, into relatively unified and coördinated wholes.

But in the emergence of such organizations we have not confronted our chained perceiver, the conscious self in the cranium to whom we gave the hypothetical task of organizing and sorting out the millions of neural impulses simultaneously shooting about the cranial cave. We have found no passive observer, no blank tablet on which experience is to write. The organisms that we study are active from the start, as surely as they are alive; and they are active in at least a roughly ordered way. Even the neonate human child reacts in systematic patterns. When he turns his head to his right side as he lies on his back his left arm comes up, crooked at the elbow. Pinch the sole of his extended foot and the leg is drawn up. Move a bright light across his field of vision and his eyes will follow; and if the pursuit is only roughly adaptive and if he reacts only when massive stimuli are presented, nevertheless the gross ordering of the responses is there at the start. Maturation and habit will refine the process, and finer coördinations will be differentiated out of the crude beginnings. Even the inexperienced organism, confronted with the massive stimulation of a complex field, gives a grossly ordered pattern of reaction. His body comes to terms with gravitational pulls and the supporting surfaces of his mother's body as he nestles into a steady-state and falls asleep after nursing. Disturbed from this state he may react diffusely and with poorly integrated coordinations (from the standpoint of

adults who know their way to various equilibrium points) but he reacts, immediately, reflexly, and with *some* organization. Even the startle pattern has an organization.

For one thing his body is not loose-jointed like a mechanical toy. Moving one of the body levers exerts a pull on adjacent parts, stretches muscles and tendons which—in turn—initiate actions in remote parts. There are sensory endings within the muscles and tendons that are pressed upon by the stretching of a tendon, the contraction of a muscle; and the fibers, of which these sensory endings are a part, travel to the spinal cord where they connect with motor fibers passing out to other musculature. Thus when some local stimulus forces a movement in some closely connected effector it sets in motion a train of compensatory consequences. Just as the pointer, in turning his head toward the bird in flight, shifts the weight of its head so that supporting musculature in the forequarters has to readjust—if *balance is to be maintained*—there is always an *inter-reflex* readjustment when a steady-state of posture is upset.

Anticipatory Postures and the Introduction of Delay

Watching the infant, at the crawling stage, it is easy to see how bumbling and inadequate these inter-reflex adjustments are. His aim in grasping is poor, his reachings throw him off balance, one member seems not to “know” of the existence of another. He is not yet of one piece, integrated. He gets himself into difficulties, unable to anticipate the outcome of his responses, and is constantly forced to readjust, to undo, to compensate, to correct. Slowly, through a combination of maturation and learning, his loose-jointed and self-interfering coördinations smooth out. Like the animal in the maze which gives up its explorations into blind alleys and moves in smoothly coördinated sweeps around curves, anticipating turns and adapting to alleys not yet seen, the child slowly reduces the amount of interference between flexors and extensors, and the parts of the body begin to fall in step and to act more and more as a unit. Integrated anticipatory adjustments are built gradually in the course of repeated action in a field. The spatial arrangement of the objects in his field becomes built into his very postures so that his movements now spring from a prepared and oriented network of supporting contractions. The infant is finally geared into the world of objects so that his localizing movements are flung directly at the stimulus-targets. As we have seen (page 437) such flung orientations are never more than roughly correct; but to the degree that they are pointed, aimed, the physical changes that strike our receptors may be said to be perceived, located.

As the preparatory adjustments grow more accurate and take into their

own structure the preparation for the consequences of the adjustment (as when a football player prepares not only to kick but to recover from the kick) and as the distance receptors keep the posture oriented to a wider and wider environment, a period of delay is necessarily introduced between the alerting stimulus and the consummatory response. The individual becomes "set-in-advance." The infant, stimulated by the sounds of preparation of the bottle emanating from the nearby kitchen, is alerted for the footsteps in the hall, for the figure that will emerge from the doorway, for the white milk; and his to-turning head, cries, diffuse hand movements, mouthing, salivating, show his anticipations long before the consummatory response can be released by the bottle-in-contact-with-lips. If human beings could not learn, if they could not be conditioned thus to adjust to objects that are not at the moment acting upon the body-surface, if the effective environment did not progressively expand in this fashion, the problem of perception would not have arisen in the form we know. This wider and wider temporal span between the moment of initiating a set for an object and the moment of releasing the adaptive response gives increasing opportunities for a lack of fit between the set and the object, for that distinction between appearance and reality, between *it seems* and *it is*. Add to this the fact that in the course of our development we build a word-world to symbolize these anticipatory sets, that we can communicate our expectations to others—more or less adequately—and we have a basis for a shared anticipation. When we become curious about the consciousness of another person, what we are able to tap by our questions is such a complex of anticipatory sets.

Tropistic, Reflexive, and Perceptual Control of Behavior

The process of transformation, which we have sketched so roughly, is a kind of recapitulation of the whole advance in control of adjustment that we observe in the evolutionary process. In the simplest animals movements are forced by the immediate impact of stimuli, the responses often springing forth fully integrated and completely organized as soon as the animal exists as an independent organism. In the lower animals these orienting movements show little change or improvement in the course of a life-span. The inflexibility of the phototropism of the moth which makes him a slave to the light source, the mechanically operating chemotropism of Fabre's caterpillars who followed the trail of their predecessors in a monotonous march around the rim of a jar until in exhaustion they fell off, the stupid ritual of the web-spinning spider which cannot interrupt and then resume its course, have long excited observers to marvel at the stupidity as well as the wonders of instinct. It is as though, given the wiring and the pattern of stimulus input, these

animals operated like electrically wired motor-driven mechanisms whose movements are completely predictable.

As we ascend the animal scale the emergence of the capacity to learn, to integrate a series of acts, and the capacity to withhold action while alerted for remote objects, free the organism from the tropic enslavement to an immediately pressing physical field of energies. The control of behavior passes to a wider field. Oriented to this field, the individual takes the entering stimulus into a larger organized whole. In so far as this whole is a developing and changing thing, the same stimulus can have surprisingly different valences. A potent stimulus becomes, a moment later, a neglected and overlooked object. The mailbox which draws the man-with-a-letter-to-mail to it, like tropic moth drawn to a flame, is passed (by the same man) shortly thereafter as though it did not exist. It is the way the stimulus fits into the total scheme of expectancies that determines its force. The outside observer who centers merely upon the physical stimulus (the hypothetical observer from Mars) might conclude that the individual has a mailbox tropism, on the first occasion; but the change in behavior would drive him to look for some internal chemical that neutralized the mechanism—as the chemical effects of eating neutralized the chemotropism of Loeb's caterpillars (see page 33). Others have chosen to say that man is a creature who behaves spontaneously, who has a mind of his own, whose behavior is not determined by his past, who behaves according to his purposes and his perceptions and not—as animals do—in accordance with the powers of external physical stimuli. And in this case we should agree. What we require, however, is an account of the development of this "mind of his own." And if our analysis is correct, the perceptual controls are woven out of a very precise and individual series of contacts with the field. As we study the development of these purposes and percepts, the spontaneous and the surprising acts appear to be quite lawful.

COMBINATIONS OF RESPONSES

In all of this we have taken pretty much for granted the *shape* of the present field. There it is, before us. And if we see it outlined, organized, that is because we are prepared (by the past in large measure) to deal with it in appropriate fashion. It is not only the remote past that has furnished us with repeated verification of our ways of dealing with the field, it is the immediate past which has just set up in us a very specific pattern of anticipations and needs. And so we say that perceiving is an addition of meaning to the given,

a conditioned response set off by some presented element often met before, facilitated and guided by the set operating at the moment.

If we confine our attention to the external field for a moment, we will do well to note that the stimuli before us do not strike us singly, but *en masse*. And if we observe closely, we shall note that the addition of new groups of stimuli changes the appearance of those already present. The additions are more than mere additions, for they create new relations, new inter-actions. If we must speak of part-processes, then inter-part processes are created by the addition. It is this aspect of the stimulating field that has led the Gestaltists to affirm, again and again, that the whole is more and other than the sum of its parts.

There should be no mystery in this; or, at least, the mystery is one we can observe in the physical world about us over and over again. A stone cast into a pool creates a symmetrical pattern of circular ripples. A second stone creates a similar symmetrical pattern of circles. Two stones cast into the pool at the same time produce a new pattern of interference effects that was not seen before. New *shapes* emerge in the combination of parts which were not given in the operation of each part, taken singly. Two make a couple, three create the eternal triangle. Two chemicals, interacting, produce a reagent whose power is not the simple sum of each chemical's force taken separately. And two stimulus-response systems operating conjointly in an organism produce a reaction that is more and other than the mere sum of the part-responses. There are inter-reflex tensions analogous to the interference effects on the surface of the pool; the inter-reflex tensions alter each of the response systems that would be seen if one were to stimulate them singly. It was in the study of *fields* of stimulation that the principles of Gestalt psychology were first formulated. Instead of looking at the process as an interaction between sensori-motor systems, however, the Gestaltist made the brain the locus of the significant events, and interpreted the fusion in terms of properties of the *neural* field.

The Phi-Phenomenon

One of the simplest instances of fusion of this sort is found in the illusion of movement known as the *phi-phenomenon*—the apparent movement of stationary visual cues. If two vertical lines are successively exposed to an attentive subject, at reading distance, in positions about one centimeter apart, the observer will get an impression of movement. That is, provided the interval between the disappearance of the first line and the onset of the second is neither too small nor too great. If it is less than 30 milliseconds the two lines appear stationary, standing side by side. If it is longer than 200

milliseconds they are again seen as stationary; the first is seen in one position, the second in another. An interval of about 60 milliseconds appears to be the most favorable for the illusion.

The optimum interval varies with the distance between the lines, with the length of exposure of the first, with the brightness of the space between the lines, and with the set of the observer. Meaningful figures (such as that of a man whose extended arm appears to strike a blow) seem to favor the phenomenon and to increase the range of conditions under which movement is perceived. Illusions of movement in three dimensions can be created by changing the size and shape of the second figure. If two V's are used, one upright and one inverted, the figure appears to rotate toward or away from the observer. Comparable illusions in the tactual field are produced when the blindfolded subject is stimulated by two successive contacts. *Here the felt movement appears to take place in the space above the skin surface.*

When the figures differ too widely, fusion becomes difficult. It would seem that two impressions fuse most readily to give an impression of movement when they can be regarded as springing from one object. In the case of the two V's the rotation that is seen is the one way in which the parts successively exposed can be fitted together into one plausible or probable whole. And the fact that *probable* fusions are preferred indicates that the past experience has contributed to the organization of the present field.

It is such a fusion of "stills" into a moving whole that we see in the motion picture. The successive frames of the film are drawn into position, and while the film is stationary a shutter opens to permit light to be flashed through it to the reflecting screen. Then while the shutter again closes off the light the next frame is brought into position. In each succeeding position the image projected on the screen occupies a slightly different position. Although the successive pulses of light originate in stationary sources, and



FIGURE 84. Figure to demonstrate afterimage. Fixate a point in the drawing for a period of 20 to 30 seconds. Then turn the eyes to a neutral gray surface. The negative afterimage will appear (black and white areas reversed).

although the stimulus is an intermittent one, the subject perceives a smooth and continuous movement; and there is no flicker.

Afterimages and Flicker

The illusory movement seems so objective, so completely “out there” that it would seem natural to look for an explanation in the sensory mechanism itself. One thinks immediately of two forms of sensory interaction with which we are all familiar, the afterimage and flicker. The afterglow of a bright light that momentarily falls upon a dark-adapted eye is persistently visible, it moves with the eye, and is as clearly sensible as other visual stimuli, as the experiences produced by some light source outside the body. We understand that the light, acting upon the photosensitive substances in the retina, has released a quantity of breakdown products. These products in turn stimulate the optic nerve. They have to accumulate in sufficient quantity before the optic nerve is excited and, when accumulated—even though the light source is suddenly cut off—will continue to activate the nerve. This latter aftereffect is called the *afterimage*. Corresponding to the experience there is a measurable physiological process going on in the eye itself. Figure 85 shows a record of electrical changes in the retina of a cephalopod, recorded by Frohlich. The figure also shows the lag between the onset of the illumination and the development of electrical potential, as well as the continuing discharge after the source was cut off.

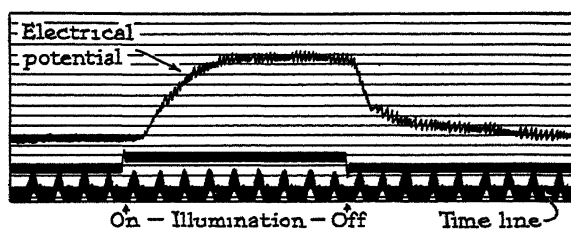


FIGURE 85. Galvanometer record of retinal potential in the eye of a cephalopod. Note the lag between the onset of the light and the onset of the electrical effect. Note also the continuing activity after the light stimulus has ceased. [Based on Frohlich, in *Zeitschrift fur Psychologie*, 53.]

If a second light stimulus succeeds the first before the positive afterimage has entirely faded out, an undulating or flickering experience will be reported by the subject. As the interval is progressively reduced a *flicker-threshold* will be passed beyond which the interrupted light cannot be discriminated

from a constant source. This flicker threshold is passed when the separate flashes succeed one another at approximately 30 to 40 per second, at the middle range of intensity of illumination. The rate may fall as low as 5 to 10 per second at very weak illumination, or rise as high as 55 per second at highest illumination. In the motion picture the frames are shown at a rate as low as 15 to 20 per second; but a shutter interrupts each still in the middle of exposure period, thus throwing the rate of interruption above the fusion point.

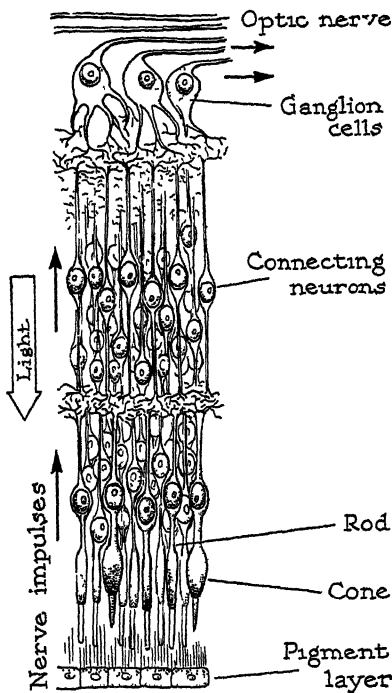


FIGURE 86. Schematic drawing of structures in the retina. The layer of pigment cells at the bottom of the figure lies next to the choroid coat and farthest from the lens and pupil. At the top of the drawing are the large ganglion cells and their axons, which leave the eye at one small area (blind spot) joining together to form the optic nerve. Broad arrow shows direction of light; small arrows show direction of nerve impulses.

Flicker rates increase with the area of the retina activated, the intensity of the light source; and they are higher at the fovea (the point of clearest vision at the center of the retina) than at the periphery. They are higher for cone-responses (daylight vision) than for rod-responses (twilight vision). These two types of receptor cells are shown in Figure 86. The slender rod-like cells are responsive to the lower intensities of illumination, and their activation produces sensations of brightness (grays) only. The cones are involved at the higher intensities of daylight vision and contain substances whose differential sensitivity lies at the basis of our color vision.

The Phi-Phenomenon Reconsidered

Returning to the phi-phenomenon, we may ask: Are there forms of sensory interaction that can account for this illusion of movement? Is there some kind of retinal diffusion that gives a physiological basis for our seeing what is not out there, even as in the afterimage we see a glowing visual patch when we know that the source has been cut off?

One fact promptly eliminates the retina as the field within which such fusion and interaction can occur. The illusion of movement can be obtained when the two succeeding stimulations are made to fall on the two separate retinas, the first stimulus on the left eye, the second on the right. Wertheimer, whose extensive work on this phenomenon led him to conclusions later incorporated into Gestalt theory, advanced the opinion that the fusion of the two part-processes occurred within the brain of the perceiver. His theory demanded that as the impulses from the retina reach the cortex of the cerebrum, ripples of electro-chemical change spread to the surrounding cortex like the ripples in the pool set in motion by a pebble. When the second center of irradiation is set up by the second stimulus, a mutual attraction between these two fields occurs, and energy travels from the first to the second. The subject's experience of movement in the external visual field is thus conceived of as depending upon actual neural events in the brain field, even as the afterimage is conceived of as depending upon a continuing retinal and neural excitation at the periphery.²

In Wertheimer's theory the experience of movement arises from cortical events similar to those that accompany actual movement of an object through the visual field. In this latter case the retinal points, and their cortical counterparts to which they are connected, are stimulated serially, one after another. In the illusion they are also stimulated, but the cortical sequence is determined by the properties of the cortical field, the flow of excitation from one center to a somewhat remote second center. In this theory the precise time-intensity relations required to produce the illusion are determined by a hypothetical rate of diffusion of the cortical excitation, the intensity of the action at the radiating centers, the space within the cortical field that has to be traversed. Such a conception would mark an advance over the meaning theory, particularly if the precise nature of this diffusion process could be ascertained. According to the meaning theory, which states that our perceptions are always of probable things, the two stationary stimuli are believed to produce the perception of movement because the stimulus field now contains elements that have been frequently present on the occasion of actual movement. These elements now act as conditioned stimuli arousing previ-

ously associated cortical elements. Before this habit explanation is considered complete, however, it must account for the precise limiting conditions under which the illusion appears. Why, for example, should two stationary dots arouse this conditioned response when they succeed one another at a 60 millisecond interval and not at a 20 millisecond interval?

Against the notion of a purely cortical in-between-process is the fact that when the successive stimuli are made to fall on the opposite retinas the phenomenon is in no wise disturbed. Pieron used an image of a white bird in a dark field, throwing it in rapid succession on the right half of the left retina and on the left half of the right retina, the eye fixations being controlled.³ The former area is connected with the right hemisphere of the optical cortex, the second with the left. Yet the optical fusion occurs as readily as though the stimulation were relayed to adjacent cortical points. Is the shift, then, essentially a shift in the sets-to-look-and-grasp-the-object?

Response Fusion at Sub-Cortical Levels

While experimental animals can tell us nothing about seen movements they do show reactions that are closely related to what we have been discussing. When the head of a cat is held in a fixed position in the center of a cylindrical visual field whose walls are lined with black stripes, the rotation of the field initiates slow movements of pursuit, interrupted by high-speed return sweeps. When the light source is interrupted at an appropriate frequency, the direction of pursuit and return sweep can be reversed. Is it not fair to assume that the cat is getting the same illusion that we experience when, in the movie, the carriage wheels appear to reverse their direction, and that the phi-phenomenon is involved?

Smith was able to demonstrate that these movements persist in animals with visual cortex removed, thereby demonstrating an inter-reflex fusion at sub-cortical levels. It is worth noting that such operated cats are virtually blind. They collide with objects and cannot see food placed before them. They do not climb stairs and they refuse to jump from a low table 25 centimeters in height; they refuse to make placing responses (preparations to alight) when they are moved toward a striated surface. It would seem in this case that the fusion of reflexes can occur at the level of the brain stem. Neither cortical fields nor probable meanings are required to explain the response.⁴

Response fusion reinterpreted If the fusion process is a fusion of movements, of full responses, then perhaps we should look at reaction times once more in seeking an explanation for the particular limiting conditions that

determine the phenomena. There is a limit to the speed with which discrete responses can succeed one another. In the simple tapping movement we can not exceed the rate of 10 to 12 per second. When visually initiated reactions are crowded within this limit, fusion occurs. As soon as the parts are separated to the point where discrete responses can be made, the illusion disappears.

As in other studies of reaction-time the phenomenon of set enters as a complicating factor. If a series of paired lines is so arranged that the distance between exposures and the direction of movement vary, the illusion will not be as clear, and false expectations will frequently *reverse* the actual direction of seen movement. A double movement can be produced if the first bar of light is followed by two bars (one above and one below). The apparent movements are in opposite directions. In this case the observer who has been looking at a series of ordinary phi-phenomenon figures commonly reports the one direction seen in the just preceding member of the series.⁵

Serial Synthesis: An Experiment in Perceiving Shapes

We do not ordinarily realize to what a great degree we depend upon the factors of simultaneity, of spatial and temporal togetherness, in our organizing of the perceptual field. A simple test of this factor can be made if a figure is presented, bit by bit, to an observer who is given the task of identifying the whole. One way of doing this is to ask the subject to look through a conical tube having an aperture at its distant tip so small that it permits the perceiver to see but a few square millimeters of surface at a time. Simple line drawings of a box, a vase, an animal, become very difficult to identify under these conditions. Unless he is restrained the subject will want to swing the tube rapidly to and fro—in which case a series of “slices” of the object can be seen, the rapidly fading afterimages persisting just long enough to fuse with adjacent points so that, in effect, many portions of the figure simultaneously activate his response systems. The relations, the shapes, so difficult to grasp when the portions of the figure are sensed one at a time, begin to emerge; the isolated bits fuse into a shape.

Perhaps the most surprising phenomenon of all is the discovery that a subject can know every part of a figure—in the sense that after many trials he has learned to trace out the series of lines with appropriately spaced turns—and yet not be able to name the form or shape until his tracing (or a goodly portion of it) actually spreads itself before his eyes. He can verbalize: “It goes down here, turns at this point, is curved here,” (and his verbalizations and gestures are reasonably accurate symbols of part-shapes); but he does not yet sense the whole that will leap up to strike the eye when all

the parts are present at once. Like one who can find his way through a maze when actually confronted with the walls but who has no cognitive map of the whole, our subject has formed a *chain* of associated—yet discrete—movements. His experience would be like that of a person permitted to view the stills that make up a motion picture film, slowly, one at a time, in search of a gesture, a dramatic sequence. He can live through a sequence of acts, and even verbalize the parts, but can make no synthesis of the whole. He is like the person who has a kind of familiarity with a downtown business district but is unable to construct a map of it; or he is like one who knows his way about from tree to tree but has no sense of the contour of the forest. He is like the company cook who has lived through a military campaign but recalls merely a series of dissociated memories of trying to get meals under hectic conditions. Obviously there are many gradations in degrees of fusion, and in the clarity of organization of the whole.

Undoubtedly, as we give our subject many repetitions and a prolonged familiarity with the paths, the web-of-relations will be built into larger and larger units until he can anticipate not merely a turn at a time but the entire sequence. When this point has been reached, the linkages—slowly built up—finally produce something that arises as a unit when the first link of the chain is exposed. Such a slow building of higher units is required whenever, as in our experiment, we deal with a discrete series of events spread out in time. The increasing grasp of the higher units, in listening to a musical composition, comes about as the repeated hearings build in longer and longer phrase-anticipations. Although any field offers some kind of dynamic togetherness, as it acts upon the perceiver, the fusions cannot occur unless the separated parts are functionally active in the perceiver within a limited time span. Thus it is that, as we work with any given group of materials over a long enough period of time, new relations of a higher order emerge. The parts begin to interact, and we begin to deal creatively with an interacting whole. The “horse sense” of the experienced campaigner, the diagnostic acumen of the seasoned practitioner, have arisen out of this slow process whereby a field is internalized. The separate and the remote are symbolically fused in one present moment.

Difficulties in serial synthesis As the perceptual response gradually develops under these experimental conditions there are many premature false diagnoses. Some detail catches the eye the first time the eye traces the figure, some fragment suggests a familiar whole; and in these cases the suggested whole interferes with the grasp of the actual figure, distorting or nullifying the effect of succeeding stimuli. Such remembered wholes reveal themselves

when the subject attempts to draw the figure, and we can see him inventing elements that had not been presented at all. One line drawing, for example, represented a girl looking into a mirror. Her hair was in curlers. Noting these "pigtails" one subject decided that the picture must be a drawing of a pickaninny. An object in the girl's hand (the oval mirror) was then interpreted as a watermelon, although this involved a gross distortion in the size and shape of the object.⁶ The whole constructed in this fashion represented an arrangement of the perceived bits in conformity with the subject's stereotypes; the drawing showed the distorting effects of this diagnosis. There is fusion, here, between the responses cued by the present stimuli and responses summoned from the past. The evidence suggests that traces of the externally initiated responses fade rapidly. They are shifted in one direction or another as the later cues produce a diagnosis which forces a realignment of the parts, suppressing here, exaggerating there *

When a whole, a shape, is completely present before the subject, it offers a steady support for the eyes as they sweep across the field, and the developing response is corrected even as it develops. The relations between the part-responses are here made stable by this support and *force* a fusion; and the sense-of-the-whole is verified on the spot. Under the conditions of the experiment, where the parts are exposed serially, bit by bit, the linkages between the parts are weak, unstable, of unequal strength, and the suggested solutions are able to overwhelm and replace the faded traces by those other responses summoned from our collection of stable stereotypes.

THE LOCALIZATION OF OBJECTS BY VISION

As soon as the anatomists revealed the nature of the lens system of the eye, a peculiar problem was posed for those who still clung to the Platonic allegory of the imprisoned observer. How could the homunculus, the conscious self, imprisoned in the cranial cave, ever come to see the world as right side up, when the shadows cast upon the retina were inverted by the lens of the eye? If it is such an inverted pattern that is relayed to the imprisoned perceiver, how does he ever manage to get it right side up? And why, when we consult our own awareness, have we so completely lost all knowledge of such a re-inverting process? It is clear that the messages relayed from the *upper* portion of the retina have come to mean a *lower* position in real space (a position that we point to "down there"), while those from the lower

* We might reflect that this is the way we build a whole out of the days of our lives. Or, rather, we build many wholes as we are preoccupied now with this, now with that major enterprise. We repeatedly reconstruct our past.

retina mean a higher position in real space. Even this statement fails to do justice to the complexity of the problem, for the paths from the retina to the cortex involve a crossing, a division, repeated relaying at synaptic junctions, and finally the activation of cells in the optic cortex distributed over the convolutions of the occipital lobe. Even if each retinal point is connected with a single corresponding point on the optical cortex the spatial arrangement among the cortical cells has little resemblance to the real space, to the geographic relationships between the reflecting surfaces that send the light rays to the retina.

The very attempt to state the problem as though we were describing the task of an imprisoned observer reveals its artificial character. We are prompted to dispense with our homunculus altogether, letting the whole organism do the localizing. We can study the development of the localizations, isolating conditions that alter their efficiency. We can determine precisely how accurate they are before training and to what degree they can be un-learned, modified, improved. And possibly we can isolate the conditions that regulate and control the process. The imprisoned perceiver can tell us very little about this.

The Nativistic or Reflexological View

The completeness and accuracy of the oculo-motor adjustments to surrounding objects, as portrayed by the lower vertebrates at an extremely early point in their life cycle, seem to indicate that these adjustments are cared for by direct reflex connections between the stimulated portions of the retina and the musculature of the eyes, head, neck, trunk, and extremities. In the evolution of these species, structures that guarantee precise integrations with the external field have developed, and these structures are inherited along with feathers, fins, and fur. Once the development of the fertilized ovum starts, it proceeds all the way to the final architecture needed to gear the organism into the environment. The growth process which produced the inverting lens, the retinal cells which send their axons centralward to the brain stem like taproots, the cortical and sub-cortical relays to the effectors, all result in precise integrations required for placing and localizing functions. They are completed in the dark: the growth depends upon no light stimuli, and the functioning depends upon no previous experience. The problem is so completely solved at the time of birth that it would appear that nature does not count upon any imprisoned observer's powers of association or reasoning. Instead, the upper retina innervates, via nuclei in the brain stem, both the extrinsic eye muscles that rotate the eyeball downward, and the head-neck-postural-manual-adjustments involved in the "pointing."

The pathways commonly presented in the anatomical texts, at least those that psychologists are most prone to draw upon, emphasize the pathway from the retina to the cortex, as though it were enough to get the stimuli to the imprisoned observer. Actually, the problem has just begun, at this point. The awareness, the anticipation, the pointing, the locating of the stimulus, require the rest of the organism, the completion of the full response. No one has ever studied the brain's perception of space. What evidence we have deals with a complete reacting system, an organism in an environment.

If we look at the neural paths that descend from the motor area of the cortex to the lower musculature we can see a dual system of crossings. (And we leave out, for the moment, the problem of how impulses ever get from the optical receiving stations at the rear of the brain to these descending out-flow points at the forward end of the brain.) Figure 38 (page 274) shows the plan of the right-left crossing, some of the fibers crossing at the level of the medulla, and some at the level of the final motor cell. It should be noted that the upper portion of the motor area of the cerebrum is connected with the musculature of the lower segments of the body.

We can conceive, on this plan, of the spatial adjustments following the retinal stimulations immediately, reflexly. Avery's observations on the foetal guinea pigs demonstrated that these action systems are completed slightly before birth in this species. He removed the young from the mother by Caesarian section some four days before full term (63rd day) and found that they were able to avoid visual obstructions. Oscillating movements of the eyeballs (nystagmus) appeared in response to rotation, on the 61st day.⁷

It would appear, therefore, that in the lower animals, at least, the pointing reaction, the "there-it-is" response, runs itself; movements are adjusted to the balance of forces impressed upon the receptor-system. If some primitive homunculus, the prototype of Plato's imprisoned observer, remains in his traditional cranny in the cortex, he is like a monarch without a regal function; he could only receive reports from a system-as-a-whole which has already functioned without him. At this level of development the "awareness of" and the "there-it-is" responses are conceived of as structurally determined adjustments of the organism-as-a-whole to a field-as-a-whole, as an integrated system of reflexes. Our understanding of this totality is not increased by breaking it into three parts called sensing, perceiving, reacting. In fact, to do so is to create pseudo-problems. The two phases of *anticipating* and *adjusting overtly* are simply two ways in which this total structure functions. As the organism matures, responding to a wider environment, tensed by remote stimuli, and delaying the overt consummatory responses, the "awareness phase" functions in advance as a kind of held-in-abeyance prep-

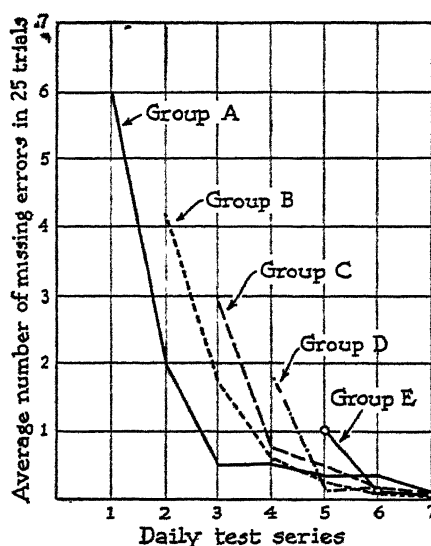
aration-to-localize. It is a suspended, or restrained, orientation-toward-a-stimulus-field.

As the child matures—and we shift to the human level for the moment—and learns the on-leading character of the stimuli in his visual field, responding to them as signs rather than as mere physical “pushes,” he assembles preparations for stimuli-to-come far in advance of the moment when, in actual contact with the coming object, his adjustment is finally released. He may locate a sounding object before he turns to touch or look at it; and this locating is no mere cranial process. It is an anticipatory tensing of the total musculature. Or he may sense the presence of something moving at the edge of the visual field some time before he turns to look at it. At the time of the first minimal impact of the stimulus on the peripheral portion of his retinas he may be preoccupied with another task, a task which involves his attention and requires the fixation of the central portion of the field. The anticipatory tensing arises even while he keeps his eyes upon the tool in his hand. The developing expectancy has to await its turn until it can be sandwiched into the interstices of automatic acts, or released at the conclusion of the attention-absorbing response. As the range of our activities expands, and the field within which response systems must interact enlarges, this interval of delay is longer. The wider the field, the longer the delay, the more we note the distinction between perceiver, and actor. But we still deal with total response systems, with reflex and inter-reflex adjustments; and although we have selected the preparatory phase as the perceptual system, this, too, is a total adjustment, involving those same receptors, connectors, and effectors. Remembering its origin we will be less prone to think in terms of an imprisoned perceiver, cut off from reality. We can turn to the task of studying the evolution of organism-environment adjustments, locating the conditions that affect their efficiency, measuring the responses.

The Habit View of Visual-Motor Adjustments

The reflexological description of the localizing responses fits the performance of the chick, the guinea pig, and the newt, better than it does that of man. To be sure, the accuracy of the pecking-seizing-swallowing coordination in the chick improves steadily over the first 5 to 10 days. The timing of the stroke, the bill-closure, have to be adjusted after the pecking process starts, and the consequences of the strokes affect the organization of the reaction. We know, too, that not only is practice required, but practice in sufficient amounts, and at a sufficiently early period, if the coordination is to reach its normal perfection. Here we discover that the organism's ability to come to terms, to anticipate, to localize, to adjust to an environment in advance, is

FIGURE 87. Curves for pecking skill in chicks, indicating that this visual motor coordination develops with maturation while chicks are kept in the dark. Group A began to peck when 1 day old, Group E was kept in the dark until 5 days old. [From W. W. Cruze, "Maturation and Learning in Chicks," *Journal of Comparative Psychology*, 19 (1935), p. 391.]



worked out in some measure in the organism-environment interchanges that we call "practice."

However, even when reared in the dark, the accuracy of the visually cued striking response in a six-day-old chick when first given an opportunity to peck, is approximately as great as that of the normally reared chick with visual experience. In 25 attempts he makes 24 hits. Figure 87 indicates that this skill has been maturing in the dark, and that with each additional day in the dark the beginners start with a higher degree of accuracy in their localizing responses.

In the human child these visual-motor coordinations develop slowly. They show, moreover, a degree of plasticity and a power of recombination that are not found in the lower forms. While their slow completion is occurring the child is also forming habits, so that learning and growth are intertwined. We can scarcely unravel the components in the absence of delayed practice experiments comparable to those on the chick; and these have not been performed for very obvious reasons.* The joint products of learning and growth that develop, the visual-motor placing and localizing responses, function with all the automatic character of the growth-determined reflexes.

Everyday observation shows, however, that they can be modified. The dentist, for example, working with a mirror that enlarges and reverses the field, adjusts his movements to these new cues so that, absorbed in his work,

* Riesen has performed a comparable experiment on the chimpanzee, demonstrating that when early development occurs in the dark a long learning period is required after the animal (otherwise mature) is brought out into the light.⁸

he loses all sense of any translation process. The anatomist tears apart bits of tissue under a microscope that offers even more drastic alterations in the field, moving his dissecting tool with complete forgetfulness of the reversals produced by the lenses. His corrections are made automatically. The plain citizen who dons bifocal lenses for the first time makes many false placing reactions, but after this first period of confusion he corrects his movements, finally forgetting the lenses. In this case a new set of connections between the visual cues and the adjustments has been superimposed upon those which existed earlier. In an experiment, Wundt, wearing lenses that deflected the line of sight five degrees in the vertical plane only, found that the displacement of objects disappeared rapidly and completely.⁹

In the mirror-drawing-experiment (see page 340) in which the subject learns to trace a reflected visual design, we saw the gradual rise of such new coordinations. Hesitant, correcting and recorrecting, the subject haltingly followed the path. Progress was slow. At the choice points, particularly, where, as in a star-shaped figure, a new direction had to be taken, the errors clustered. But the time came when the stylus could be guided through the maze without a contact, and as rapidly as was originally possible with undistorted vision.

EXPERIMENTAL INVERSION OF THE VISUAL FIELD

The possibility of establishing new visual-motor habits encouraged investigators to attempt a drastic type of re-education. How far could retraining be carried? If a person wore lenses that completely inverted the visual field, and wore them every waking moment, would he gradually become so accustomed to the new relationships that all sense of inversion disappeared? And would not such retraining at least open the possibility of a habit explanation of human localizing responses? Could such subjects be trained so that their localizations reached the limits of speed and accuracy previously developed in normal vision?

Results for four subjects who wore the lens-systems for periods of from one to two weeks with lens-vision functioning in from 87 to 250 hours give complete agreement on three points.¹⁰

1. The upside-down appearance of the visual field did not disappear within the limits of training

2. Specific habits, such as card-sorting, were developed to the pre-experimental limits of efficiency in spite of the inverting lenses.
3. When the lenses were removed at the end of the experimental period there was a brief period of confusion in which faulty visual-motor adjustments appeared. Within three days all confusion had disappeared.*

The observers reported that there were times during their training when the subjects became so absorbed in their tasks that they lost all sense of inversion. These exceptions to the rule tempt one to predict that with sufficient training a complete new set of spatial adjustments could be established. Two hundred hours, however, were not enough. Moreover, it was found that the habits developed within the most practised areas (such as card-sorting) did not transfer to other areas. The subjects continued to think about and to imagine the appearance of the visual field in the pre-experimental terms. When they named the colors of objects (when asked to name the color of a near object) they chose the phenomenally near one (actually the color of a far object).

Inverting the Visual Fields in Amphibia

Whatever the outcome of future studies on human subjects, a study of localizations in amphibia clearly favors the reflexological view. Using the red-spotted newt Sperry was able to rotate the eyeballs through 180° , detaching the eye and rotating it without injuring the optic nerves. As soon as the eyes were attached in their new positions false movements appeared, and they continued throughout a period of observation lasting four and one-half months. Finally the eyeballs of two animals were returned to the pre-operative position and further observations were made.

The newt depends upon his eyes in locating prey and will swim to a small lure at 25 centimeters distance. There are also compensatory head movements in response to rotation of the visual field (slow pursuit and rapid return). The operated animals showed all of these adjustments in reverse. They collided with objects they would normally have avoided. They turned their heads downward and moved toward the pebbly bottom of the aquarium when a lure was dangled overhead, pushing their heads among the pebbles.

* Stratton reported extensions of the wrong hand, false turns to avoid an obstacle, moving the head up when it should have been turned down, etc. Dizziness, swaying of the visual field, blurred vision, difficulties in fixation, were reported by Ewert. All of these confused responses occurred during the first three days of the post-experimental period when no lenses were being worn. In spite of these changes the post-experimental field never appeared upside down.

If the lure was placed below them, it aroused an upward movement toward the surface.

At the end of two weeks the experimenter noted that the animals with eyes rotated appeared considerably lighter in color, their black dorsal surfaces turning to an olive green. Controls remained the same. This coloring of the dorsal surface is controlled by the upper retina, and in the experimental animals this upper retina no longer received its light from the bottom of the aquarium. Instead, it was affected by the overhead lighting. When three operated newts were placed in an aquarium lighted from *below* (with the top of the aquarium darkened) the backs of these animals became dark again. A normal control placed in this same special container became light in color.

All of these unusual adjustments in the operated newts persisted without change for four and one-half months. Even in an aquarium with familiar and simple topography (which would presumably favor relearning) there was no evidence of visual re-education. One hundred and forty-two days of the "inverted field" did not alter circus movements, reversed localizations, reversed pursuit movements. The animals were still colliding with the "familiar" visual environment; and the color changes continued to differentiate the normal controls from the experimental animals.

When the eyes were returned to their original position the newts were kept in complete darkness for a recovery period. When, on the third day, they were returned to the light, their normal visuo-motor behavior returned at once. Swimming, localizing, reacting to a rotating field, they gave no sign of any aftereffects of the operation. Their dorsal surfaces returned to the normal dark color.

In another study, Sperry observed the aftereffects of a procedure that combined the severing of the optic nerve with rotation of the eyeball.¹¹ In this species a severed optic nerve will regenerate and vision will return within a 30-day period. The optic nerves were severed through an incision made in the roof of the mouth. The individual fibers were teased apart so that any neat juxtaposition of fibers with their corresponding severed axons was impossible. Nevertheless, following regeneration, normal vision was resumed. He found that if the eyes were rotated through 180° at the time the nerves were severed, effects similar to those obtained in the rotation experiments described above were found. Again, the structurally determined handicap persisted, uncorrected. In this instance the regenerating fibers (whose cell bodies are located in the rotated retinas) have grown toward approximately the same anatomical destinations that they did originally, in spite of the fact that the retinal origins of the regenerating fibers had been rotated.

TRANSPOSITION OF OTHER SENSORY SURFACES

The studies of Stratton and Ewert, examined above, left us somewhat in doubt as to the ultimate outcome of prolonged re-education. In contrast to the amphibians studied by Sperry, at least a partial re-education of localizing movements seemed to occur in the inverted field, although the verbal reports continued to show that the field *appeared* inverted up to the end of several weeks of retraining.

By means of an apparatus he called the pseudophone, P. T. Young produced analogous reversals of auditory cues.¹² This apparatus consisted of two tubes, one for each ear, leading from the external opening of each ear and passing over the head to an enlarged orifice located at the position of the opposite ear. Thus the air waves from a sounding object on the right side of the subject's body would enter the orifice on this side but would be led through the tube to the opposite ear. The usual temporal and intensity relations between the actions upon the two tympani would thus be reversed. Wearing the pseudophone for a few hours each day (for a total of 56 hours spread over 18 days) Young's subjects experienced a reversal of auditory localizations, and these false localizations persisted up to the very end of the experiment, although the subjects learned to disregard the auditory cues when both vision and hearing were operating. When the trained subject looked at a sounding metronome, the visual and auditory combination produced no confusion and the seen locality was all that was noted. At the beginning of the period a double localization had been experienced. When the pseudophones were first put on and the subject faced a street, a vehicle approaching from the left would be heard on the subject's right. When the subject was walking slowly along the street, the footsteps of a pedestrian rapidly approaching from the rear left would cause the subject to dodge *into* the path of the passer-by. With practice the experimenter learned to deliberately move in the direction opposite to the perceived locations; but the illusion was not lost within the limits of the training period. The subject had to remain on guard.

The Phantom Limb

Phantom limbs and referred pains offer additional evidence on this problem; but the data are not altogether clear. In the amputation of a foot or a forearm the regenerating nerve fibers come to supply new skin surfaces in the stump. When the afferent fibers that once carried sensory stimulation from the hand or foot centralward to the cord are now stimulated, the *old*

perceptions persist * Usually these phantom limbs disappear after gradually undergoing a progressive shrinking in apparent size, but they have been known to persist unchanged for years. It has been argued by some that the critical factor differentiating between the different types of post-operative progress is the degree to which the limb is used for active manipulations. Active practice of the member provides the necessary basis for re-education (extinction of old tactual-motor responses and their replacement by new superimposed anticipatory adjustments). A person who is so extremely sensitive to his deformity as to be unwilling to expose the stump would, by keeping it hidden and inactive, fail to learn new adjustments; and in this case he would not learn to locate the source of the stimulation in the stump. It is interesting, in this connection, that Gallinek reports that he has never seen a case with a phantom limb when the amputation has been performed at birth.¹³

Others have argued that the phantom persists when the stimuli contain a large pain component. Such pain stimuli are produced by mechanical pressures acting directly upon the nerve (pressures originating from developing scar tissues or from muscle contractions) or by chemical conditions (oxygen-deficit) acting directly upon the nerve. When such pain stimuli are persistent and intense they maintain the old reflex adjustments and block the processes of extinction and re-education. Riddoch asserts that whenever a massive, painful stimulus is applied to the stump, the phantom limb appears.¹⁴

A third approach is taken by those who observe that pain sensations are sometimes symptomatic of a more general state of affairs. Ewalt and others noted (in a group of 400 amputees) that less than 2 per cent reported phantom pain. Those who complained also had complaints of psychopathological nature; and the reported pain tended to disappear and return along with the improvement or worsening in general adjustment. In their opinion the phantom pain is "merely the misinterpretation of a phantom sensation by certain individuals who show psychopathology." Ninety per cent of the group had reported phantom sensations. One of Ewalt's patients was a woman of 40 who had undergone an amputation at the age of 7. She had not been free from phantom sensations in the 33 years that followed. Two episodes of pain, one 30 years after the operation, had accompanied periods of economic and emotional difficulty. According to this view the disappearance of the phantom may be viewed as a kind of learned neglect,

* The illusion is sometimes accompanied by excruciating pains. Superstitious patients have been known to demand that the amputated member be exhumed and placed in a more comfortable position, asserting that it must have been buried in a cramped position, etc.

a suppression by a new superimposed sensori-motor adjustment. The recurrence under stress suggests that though suppressed, the older patterns are never destroyed or completely forgotten.¹⁵

Transposition of Skin-Surfaces

When a flap of skin with its attached innervation is shifted to a new position the subject continues to feel the tactual stimuli in the old position. Douglas and Lanier report a case in which a flap of skin was moved from the upper to the lower lip, one edge of the flap remaining anchored at the corner of the mouth.¹⁶ Although the predicted illusory localizations occurred the subject learned to make the correct responses *

A case reported by Purdy emphasizes the lack of any response to post-operative training.¹⁷ At 13 years of age the end of a middle finger was amputated and a flap of skin from the palmar surface was folded over the stump. A portion of this flap, 6 millimeters in width, extended beyond the stump and was sutured to the back of the finger. Ten years later stimuli applied to this dorsal flap were still sensed in their former position.

Experimental Transposition of Nerves Supplying Skin Surfaces

The very extensive literature dealing with the recovery from accidental or surgical transposition of nerves supplying the skin, in man, does not permit clear-cut appraisal of the limits of re-educability. The weight of opinion seems to favor the notion that, although they may persist for years, false localizations usually give way to correct ones. Even on this point the explanations for recovery indicate divergence in the understanding of the process. For some, all recovery is a matter of growth of the fibers, the early false references being due to the early maturation of a few axon tips. With subsequent maturation of the bulk of the fibers to appropriate areas the false references due to the few stray fibers are overcome by the predominant correct localization reflexes. Others place greater weight on the relearning process.¹⁸

The evidence obtained from studies of the experimental animal is more precise. On the rat there is virtually no recovery. Crossing the cutaneous nerves supplying the two hind limbs of the rat, Sperry found complete and permanent reversals of localizing responses. Shock to the sole of the right foot produced withdrawal of the left; and while the shock increased, and the

* It will be recalled that in Ewert's card-sorters correct overt localizing movements were also made in spite of a persistence of the inverted *appearance* of the visual field. Here two response systems co-exist, side by side: the old one (now illusory) which developed on the basis of native reflexes, and the new "corrected" localization.

left foot was lifted higher and higher, the right foot continued to rest upon the electrode that was the source of the painful stimulus. The head was turned toward the left foot and the latter was licked ¹⁹

Daily training of three animals, in which an electrode was applied to one foot through the mesh of the cage floor, taught the animals to hop away from the spot more quickly; but they continued to lift the wrong leg, turn to the wrong side, lick the wrong foot, at the end of a month. In one series of tests Sperry used a conditioning technique. A buzzer was sounded before the electrode was applied to the right foot. Normal rats learned to lift the right foot at the buzzer. Operated animals continued to lift the wrong foot in spite of the fact that this failed to accomplish any shock-avoidance.

Sperry taught his animals to remove wire clips from the sole of the foot. The procedure was time-consuming because of the steady interference of the false localizations. The clip pinching the right foot directed the animal to the left. Although a final solution was achieved this type of re-education did not affect the maladaptive spinal reflexes. While they were pulling on the clip, to remove it, the left leg executed spasmodic withdrawal movements; and once the clip was removed the animal turned to lick the left foot. Like the card-sorters of Ewert's experiment, they learned a formula for achieving an end-result, but the reversal in localization responses persisted.

The significance of the findings on the rat is limited by the fact that the cortical centers that would conceivably mediate re-education of the type found in man are less highly developed in this animal. The negative evidence on the lower form does not permit us to generalize.

These experimental studies of the effect of translocation of sensory surfaces have carried us far from the imprisoned cranial perceiver of Plato. In his place we have a conception of organisms whose sensori-motor adjustments virtually gear them into their spatial milieu. Perceiving—in the sense of locating—is an over-all sensori-motor adjustment. In the chick, the newt, the guinea pig, the rat, these adjustments are guaranteed by the growth of bodily structures, neuro-muscular connection systems; training can neither hasten nor modify the outcome to any extent. Lacking the requisite studies of the developmental period, the case for man is left in doubt; but even here we have found that the attempts to modify the fully developed patterns meet with a surprising amount of resistance. Where, as in the case of the elimination of the phantom limb experience, the re-education seems to be complete, the old, overlaid, biologically ancient patterns seem ever ready to break through the superimposed correct ones. Where education succeeds, the whole sensori-motor apparatus has to participate in the retraining, and habits have to be carried to the automatic level. In any case recovery is slow.

TRANSPPOSITION OF MOTOR NERVES AND MUSCLES

The adjustments of an animal, as it moves through a visual field, involve not only head and eyes but all of the extremities. In the highly differentiated forelimb of the monkey these movements involve reaching, grasping, pulling in, manipulating. Even the rat possesses highly skilled capacities for manipulation—witness the rotating and manipulating of the pups as the mother rat snips off the fetal membrane at their birth, licks and retrieves the pup. Perceiving involves much more than a mere looking-at; there is a total adjustment of all the members to the field.

When the innervation in a single segment of this responding system is translocated, all other portions remaining undisturbed, serious confusion results. Sperry crossed the motor nerve outflow leading to the flexors and extensors of the forelimbs of rats and monkeys, severing the nerves from their normal attachment and permitting them to grow into the opposed muscle.²⁰ The movements of flexion and extension were reversed. In stepping over a barrier the rat extended its limb instead of flexing it. In reaching for a lure the contractions carried the monkey's hand to his chin and away from the goal. But at this point the resemblance ceased. Whereas the rat continued with its maladaptive reversals unchanged for over a year after the operation, the monkey showed a gradual elimination of the reversed movements, the substitution of various trick coördinations which achieved useful end-results without the use of the transposed muscles, and finally the development of ways of using the transposed muscles themselves.

As the monkey recovered, his attempts to reach a lure grew cautious. The frustrating false movements arrested whatever was going on and the animal "turned his attention" to the recalcitrant member. His first progress consisted in dropping the use of the reversed neuromuscular elements altogether. He discovered other ways of moving the forearm, for example, he allowed gravity to pull the hand down without extensor action, or he would lift the upper arm and allow the hand to fall inward without flexor action. So cleverly did the animals execute these movements that within six months a casual observer could scarcely notice any motor disability.

In order to force further advances in control of the member restraints had to be imposed. Sperry forced his animals to secure food by reaching through a tube just large enough to permit the clenched fist to pass and long enough so that while the upper arm was held in one position the free forearm movements could be executed. With the trick movements thus prevented the full

reversals reappeared. (Within the free field they had disappeared within two or three days.) With daily practice for three or four weeks a *stationary* lure could be grasped without reversals, though occasional lapses persisted for 16 months. With a *moving* lure perfection was never attained even with periodic training periods extending over three years.

Clinicians who have studied recovery of function in human subjects following similar surgery report that the control of localization requires the full attention of the subject and that, in moments of abstraction, or under conditions in which full and deliberate preparation for the response cannot be made, the reversals continue to appear. In the experiments of Sperry the successful training was a slow, trial-and-error process. No sudden, insightful reversals appeared, and there was a surprising lack of transfer from one training situation to another. The simple matter of changing the position of the tube from the front to a new position at the side of the cage introduced the reversals once more.

The development of the new coordination followed a typical course, as described by Sperry:

"At first the flexor movements in the proper direction occurred accidentally and were peculiarly sudden and spasmodic. For example, in an attempt to flex the forearm upward with the upper arm stabilized horizontally in the tube, the predominant reversed extension was occasionally broken by a sudden upward flexion of the forearm, which immediately was snapped back into extension. There seemed to be little or no control over these early accidental movements in the proper direction. Even when the arm flexed sufficiently for the hand to come in contact with the lure, the lure was not grasped. It was as though the correct movement had caught the monkey by surprise, so that it was not prepared to grasp with the hand at that moment. In time the animal learned to grab at the lure at the height of these sudden upward swings. Later still, some control was acquired over the flexion itself, so that the movement could be made more slowly and steadily, allowing time for the wrist, fingers and angle of the forearm to be shifted in adaptation to the particular position of the lure."*

The intent to localize and grasp organizes a complex pattern of movements; and a large part of the re-learning seems to be a matter of re-inserting the hand and finger grasping movement in a new movement-complex. In-

* R. W. Sperry, "The Effect of Crossing Nerves to Antagonistic Limb Muscles in the Monkey," *Archives of Neurology and Psychiatry*, 58 (1947), p. 466. Used by permission.

stead of intending a grasp at the end of an extensor contraction the grasp had to be inserted into an intended flexion complex; or, at any rate from the standpoint of the trying monkey this is what it must have seemed like since now the *intent* to move the flexor is followed by an actual extensor contraction. Even when the hand could be brought up to the lure the act of plucking it sent the hand flying into a flexor position. The old extend-and-grasp *set* released a grasp-flex movement. If we think of the localizing and grasping movements of the forearm as regulated and initiated by the looking (eye-fixation, head-turning, postural orientation) then the neuromuscular units that control the forearm—operating on the old plan—produce false movements. The forearm portion of the plan has to be inhibited, and in its place a new one inserted.

Transplantation of Muscles in the Extremities

Experimental transposition of the peripheral ends of muscles of the forelimb, without disturbance of innervation, results in reversals. In the rat there are a few trick movements in which the frustrating contractions are eliminated or by-passed, but in no case did the timing of the contractions and the rerouting of impulses shift so as to make the new coordinations conform to the needs of the animal. Sperry instituted prolonged retraining procedures in order to facilitate the type of reorganization found in the monkey, but without success.

A human subject could achieve considerable skill under such conditions. By intending, or willing to flex his arm he could accomplish an extension. Where nerve crosses have been made in human subjects so that, for example, the nerve that supplies the tongue was directed into the facial muscles, contraction of the facial muscles was observed when the subject chewed; and the facial musculature could be contracted voluntarily when the subject deliberately rolled his tongue. Clinical observation indicates, however, that there is a great deal of difference between such voluntary contraction and automatic movements such as walking, reflex startle movements, and the like. In the automatic movements the transplanted connections preserve their original roles. The walking coordination seems to be preserved as a neuromuscular unit, and though the voluntary and deliberate use of the musculature can be superimposed upon these units the coordination is not itself broken up and reorganized according to the demands of the new adjustment. Temporary lapses into these original patterns recur even when voluntary corrections have existed for years.

Evaluation of the Translocation Experiments: The Motor Theory of Perception Contrasted with Organismic Theory

Perhaps the principal conclusion from the review of these experiments is that when we perceive, we perceive all over. The pattern of stimulation falling upon our eyes, ears, skin surface, spreads through neural tracts to effectors until in our posture and in our reactions we adjust to the field that set the impulses streaming inward toward the centers. The whole body points. That is to say, it is oriented, set, aware of, adjusted to, the sources of stimulation. The organism and its milieu are continually meshing, in this fashion. Now this conception is quite different from saying that, since there is a reflex connection between eye and hand, the pointing movement of the hand tells *us* where the object is located.

The motor theory of perception For a number of years what was called the motor theory of perception offered a special version of the ancient cave allegory. The principal difference marking the motor theory as unique was the fact that instead of scrutinizing the retinal report, the little man in the cave now was described as waiting to receive word from reactions of hand or eye musculature, the kinesthetic reports being accepted instead of the retinal or skin-surface stimuli. Thus a long line was perceived as longer than another because it initiated a longer sweep of the eyes, and the feel of the longer movements was what announced to the cave-dwelling perceiver the true meaning of the retinal cue. Like the James-Lange theory of the emotions, in which consciousness recorded the backwash of the bodily reverberation, this motor theory of perception posited a time-order of events in which there occurred: (1) a stimulus, (2) a neuromuscular response, (3) sensory impulses travelling from muscles to the cortex where they aroused, finally, (4) a conscious perception of spatial relations. Although the musculature was thus given a new and important role, it would seem that a conscious mind is still doing the perceiving in the skull-cave. It has merely shifted its attention from the visual to the kinesthetic stimulus.

Certain troublesome data make us uncomfortable about this picture. Actually, the perceiver knows where the object is before he makes any *overt* response, any pointing reaction. If we insist that he is making incipient pointing reactions, as Watson did, and locate the mechanism that carries this perceptual process in precisely the same apparatus that operates in the overt approach and manipulation, then we have merely broken the total response into two phases. (1) a preliminary set of expectancies, readinesses to react, existing through a tensed period of delay in which no overt response

occurs, and (2) a final, overt, consummatory phase. But we must also note, having made this neat dichotomy, that if the neural outflow to the arm muscles has been transposed so that during the preliminary, expectant, phase, the antagonists to those muscles normally used in pointing are tensed (as in Sperry's experiment, page 493) there is no evidence whatever that a shift in the apparent position of the target or lure has occurred. In fact, it was not until the localizing movement of the arm was actually released that Sperry's monkey was aware that anything was wrong. The rat did not even note it then. The monkey, surprised to see his hand move in the direction opposite to that which he had anticipated, halted all movements and concentrated on the offending member. But as far as our evidence goes, his perception had not been false, his orientation, expectation, set for the reaction-to-come, was apparently quite correct. Actually, expectancies in the *rest* of the musculature were correct, unchanged. We may ask why the limited and false incipient contractions of the forearm produced no sign of a slight translocation in the perceptual phase, or we may raise the question as to how much of the musculature must be translocated before the apparent position of the object is displaced; but we lack the evidence on which to base our answers.

THE CONTROL OF ADJUSTMENTS IN A VISUAL FIELD

In order to simplify the problem of visual localization, let us imagine a subject seated in a dark room, with one eye blindfolded, the other eye stimulated by a point of light. He is instructed to point toward the source of stimulation. We need not concern ourselves about any possible effect of differences in the images received by the two eyes (which differences give us cues when using normal, binocular, vision), and we can neglect the form or shape of the stimulus as well as size and intensity factors which might give the subject a cue. We ask him merely to indicate the *direction* from which the stimulus comes. When we flash the point of light, the subject's eye and head turn in the direction of the source (the first localizing movement) and the hand is then raised in pointing toward the source. In our illustration the pointing of the hand, which completes the localization process, does not occur until the eye and head are directed toward the source and the visual stimulus falls upon the fovea. With a second stimulus from another quarter, with a different pointing reaction, but the same sequence of looking and pointing, the second *retinal* stimulus is the same foveal one. It is apparent that the retina alone does not control the pointing reactions or provide the cue sufficient

to perceive locality. The stimuli arising from the kinesthetic receptors in the eye muscles, muscles of the neck, shoulder girdle, the entire posture, are involved. The pointing hand always moves from a supporting postural matrix.

The early attempts to explain this power to localize stimuli falling upon a receptor surface (for example, skin or retina) developed the concept of *local sign*. The capacity to discriminate and localize demands, it was argued, that each point stimulated have some sign of locality in addition to its qualities of intensity or extensity. Coupled with this, of course, was the notion of the imprisoned perceiver in the brain who received this local sign, recognized the "there-ness" implied, and then issued commands to the appropriate muscle groups involved in the localizing movements. Our illustration leads us to infer that the retinal stimulus alone is not enough to regulate such localizations.

Can One Eye Provide the Essential Cues for Distance Perception?

Although our one-eyed subject in the darkroom will be hard pressed to tell how far away the point of illumination is, we know that in the ordinary visual field the person who has lost the sight of one eye does not suffer any gross impairment of spatial reactions. What cues can he employ?

1. Knowing the actual size of familiar objects and the variations in the visual impression with different distances, the variations in the size of the retinal image will afford clues as to the distance.
2. At great distances colors are less saturated, approaching a faded blue. The intervening atmosphere alters the apparent color, creating what is known as aerial perspective.
3. The mere fact of superposition gives cues as to relative distance. The in-between object cuts out or obscures a portion of the in-behind object.
4. Perspective (the combination of apparent size and position in the field) provides cues. (Two rails appear to converge at the horizon, the distant locomotive is higher, smaller.)
5. Relative motion of objects—as, when fixating a point in the field, more distant objects move in a direction similar to that of a moving observer's head, while nearer objects move in a contrary direction—gives cues for differentiating distances. Looking from a moving car at an object in the middle distance would illustrate such an occasion.
6. Combined with other cues the blurred images produced by objects lying outside the range of lens-accommodations can arouse the meanings "near" and "far."

It is easy, in presenting a list of cues of this sort, to convert the perception process into an elaborate type of judgment. This would, of course, falsify what actually takes place. The subject does not note the size of his retinal image and then, comparing it with some other remembered standard, infer its depth in the field. The reverse is nearer the truth.* We perceive depth immediately. Some of the cues activate innate mechanisms, some have to wait until conditioning has given them a meaning. In the monocular factors we are here considering, conditioning is largely, if not wholly responsible. In any case, for mature and experienced perceivers, the cues operate immediately, automatically. It requires a carefully planned experimental analysis to isolate them.

This list of cues should serve to remind us of three things. (1) many of our perceptions which we take for granted are the result of an elaborate training process; (2) they may be sharp and clear without our having any awareness of the factors that contribute to the total reaction (For that matter we are never aware of the precise muscular elements that enter into a voluntary movement), and (3) typically the responses are cued by a complex set of factors. No local sign reports to an imprisoned perceiver. Cues from within and without, from the posture and from the field, combine to produce the localizing response.

Our reactions to the speech of our friend are such unanalyzed total reactions, we are not aware of syllable strokes, lip and tongue movements. We hear meanings, not sounds or movements. Often when we are questioned immediately afterward, we cannot identify the cue that determined our reaction. It was merely "something he said . . ."

These facts warn us against accepting too simple a form of the movement theory of the process. The movements of perceiving are not the same as the movements we use in reproducing and recalling. The primitive artist whose crude representations of ranks of warriors places one warrior above another, neglecting the different sizes that perspective demands, could nevertheless perceive the depth factor better than this would indicate. No doubt with bow and arrow he could demonstrate the fact by an adequate localization. Thus we must insist that the possession of differential reactions for two different situations does not mean that the items in which they differ are thereby discriminated. And, conversely, the inability to reproduce, symbolize, and represent, should not be considered valid evidence of a failure to perceive.

* Long before these monocular factors were known, depth was immediately recognized. The primitive artist who drew the distant figure of a man in the same scale as the near figure, placed the distant one higher in the field but apparently had not hit upon the size factor. He may have been vaguely dissatisfied with his reproduction, but the analysis of his failure was a much slower process.

Our word-worlds and stereotypes get in the way, here; and for many of the discriminations we have no corresponding symbolic responses. A large and very useful part of our education consists in training in discriminating the cue and in symbolizing the percept. The physician has been trained to differentiate the sick from the well, and to locate the items of difference; the efficiency expert, to discriminate between two methods of production and to locate sources of inefficiency. Both artist and scientist are trained in formulating and symbolizing the structures that are perceived.

Can the Muscular Tensions Involved in Accommodation and Convergence Produce a Perception of Distance?

In fixating and focusing the eyes two groups of muscles are tensed. If the imposed strain is prolonged we feel these tensions. Since the days of Wundt there have been many who have affirmed that the kinesthetic cues arising from accommodation and convergence give us a basis for estimating the distance of the fixated object, although all have agreed that the accommodation mechanism, alone, gives a relatively poor basis for judgment. In the case of accommodation, the kinesthetic cues were believed to arise from the ciliary muscle, which is attached on one side to the rim of the lens and on the other to the sclerotic coat of the eye. This latter coat, pushed outward by the pressure of the eye fluids, exerts a pull (via the ciliary muscle fibers and the ligaments attaching the muscle to the lens) so that the lens tends to be pulled flat. When the ciliary muscle fibers shorten, however, this circular band of contractile tissue pulls the sclerotic coat in, lessens the tension on the lens, and the internal pressure of the elastic lens then forces the latter into a more nearly spherical shape. For near objects the curvature of the lens is increased, the ciliary muscle is contracted. For far objects the muscle is relaxed, and

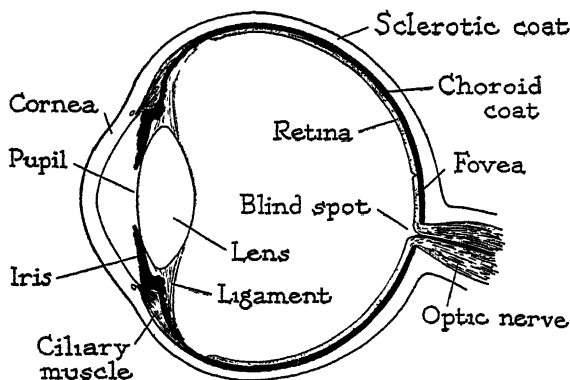


FIGURE 88 A cross-section view of the human eye.

the strain of accommodation is less. It was argued, by Helmholtz and Wundt, that it was the sensations arising from these actions of the ciliary muscle that enabled the subject to perceive depth with one eye. Or, at least, it was argued, after all other factors have been eliminated there would still remain this clue.

Wundt attempted to test such monocular vision by means of a procedure employing two hanging threads. An observer looking through a tube saw a black thread against a white background. After observing the background, and then the thread (and accommodating so as to get a clear image of the latter) the observer turned away briefly and then turned back to look at a second thread which had been substituted for it. If the observer could report a change in the apparent distance of the thread, and could discriminate correctly between "approaches" and "recessions," it was concluded that he had demonstrated depth perception. Wundt's data placed the difference threshold for monocular vision at 7 per cent. (Thus, two threads placed at 94 and 100 centimeter distances from the observer could not be discriminated.)²¹

Hillebrand and Baird, using improved techniques, found much higher thresholds (12 to 32 per cent). As with other cases of successive comparison the abruptness of the transition affects the threshold.²²

Not only are the accommodation cues coarse, but when they are combined with other retinal cues the latter tend to dominate. Thus Hillebrand found that with a diaphragm varying the size of a circular patch of light, diminishing in size as it approached, although accommodation gave clear images and the kinesthetic cues which should have meant "nearer," the subjects all reported a perception of movement *away* from them.

Using a technique in which a fixation target (formed by a circle of light) could be varied in size with changes in distance so that the visual angle (retinal size) remained constant, Bourdon arrived at the notion that the accommodation apparatus was altogether without value for depth perceptions. Two targets, alternately lighted, placed at 2 meters and 20 meters, were not judged correctly. If the observer's head moved, then a cue was provided and discriminations could be made.²³

Bourdon's results raised questions about the "strain of convergence," also. It had long been asserted that, since the fixation of the eyes on a very near object involves a greater convergence and a greater muscular tension in the ocular muscles, in all probability the kinesthetic impulses arising from these eye muscles provide one of the controls for adjustments in depth. Even with two eyes Bourdon's subjects estimated the distance of a 4-meter target all the way from 3 to 10 meters. A 22-meter target was seen all the

way from 12 to 25 meters away. And there was evidence that with a shift to entirely unfamiliar surroundings these errors were magnified.*

Compared with these crude thresholds, the accuracy of perception that appears when both retinas are used in normal fashion is extremely high. In what has been described as the "three needle experiment" two stationary needles are mounted in small wooden bases while a third, similarly mounted, is moved backward and forward between them. If the subject's vision (binocular) is limited by an observation tube so that he can see just the needles, a threshold for distance perception of approximately 0.03 per cent can be obtained.

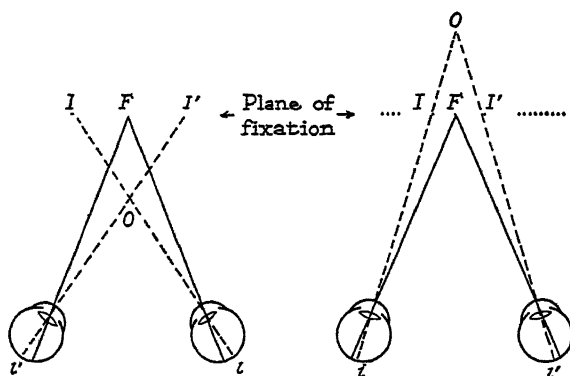


FIGURE 89 Crossed (left) and uncrossed double images. *O*—object. *F*—point of fixation. *I* and *I'*—images of *O* on plane of fixation. *z* and *z'*—retinal points corresponding to *I* and *I'*.

Double Images

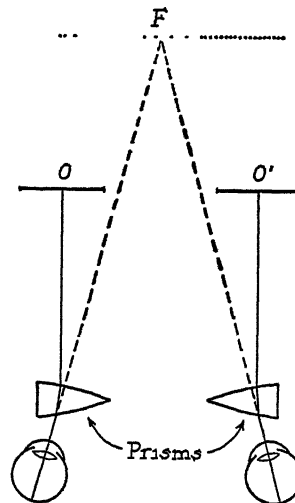
If an observer looks at a small transparent cone so placed that its tip is toward him and appears to lie directly in line with the center of the base, the closure of first one eye and then the other will produce two results. If the observer fixates at a point on the plane of the base, the tip will appear to

* One interesting sidelight on the nature of inter-reflex controls appeared in an investigation by Bappert. Employing an improved modification of Wundt's technique, he found that with distances of 30 to 90 cm, the comparisons of distance were correct in only 27 per cent of the trials. Yet at the same time he was able to verify the presence of convergence movements of the eyes in the correct direction in 93 per cent of the trials. Since the monocular cue controlled the convergence of the unstimulated eye it is seen that the accommodation of one eye can initiate a coordinated fixation of the opposite eye (adjusted to the distance of the target) without a correct judgment (verbalized) being possible. The interocular reflexes are more efficient than the over-all localizing responses. The eyes are adjusted but the organism as a whole is not.²⁴

move back and forth as the eyes are opened alternately, and the image seen by the right eye will appear different from that seen by the left. If, with both eyes open, he fixates at the plane of the base, the tip of the cone will appear blurred, or double.

Or, let the observer hold his two index fingers upright before him, one beyond the other, fixating upon the nearer. As he closes first one eye and then the other the image of the farther finger appears to jump back and forth. A corresponding doubleness of the near finger arises if he fixates the farther point, and as he alternately closes the eyes the near finger appears to move. Generalizing, we may conclude that all points in front of and beyond the fixation point are doubled, blurred. Further, the degree of doubleness increases as the two fingers are separated. Again, if we fixate the more distant finger and close the right eye, the near finger appears on the right. If we fixate the near finger, again closing the right eye, the remote one is seen on the left. The common way of expressing this fact is to say that the double images of objects lying beyond the plane of fixation are uncrossed, while those lying on the side of the observer are crossed.

FIGURE 90. Diagram showing the principle of a prism stereoscope. The slide consists of two pictures (O and O'). Light rays from O and O' are bent so as to fall on the retina as if coming from F , the point of fixation.



The stereoscope (Figure 90) affords an illustration of the operation of these double images. Cards, upon which are mounted two pictures taken by a double camera so constructed that the two lenses replace the two eyes of the seeing subject, are placed before a lens system so that the subject is able to fuse the two pictures into one image. That is to say, the right eye receives the right camera picture as it converges upon F , and the left eye receives the

left camera view as it converges upon the same point. So fused, the two views create a realistic impression of depth.

The functional equivalent of double images can be achieved with a single eye through head and eye movements, and it was this possibility that vitiated much of the earlier work on convergence and accommodations. In addition, the single eye operating under the usual conditions makes use of size, shadows, superposition, and so on. Thus, a one-eyed subject, who can move freely, achieves localizations that are nearly as efficient as those of the normal two-eyed subject. Beyond a range of from 600 to 1000 meters the double images do not provide discriminable cues.

It should be noted that we are dealing with *relative* distance in these discrimination tests. These cues tell us which objects are nearer, farther. The translation of such cues into localization movements will involve an experience factor (since angular disparity can be the same for objects of different sizes and distances) as well as corrections from the field in the course of making the movements. The cues will be most effective when they are combined with (1) full vision of the field (including the subject's own body), (2) familiarity with the objects, and (3) familiarity with the total field.

Uncorrected Visually Cued Localization Movements

The field that is fully illuminated also contains, visually, the subject's own body. The reaching arm is visible, moving against a background of objects, and the movements of the arm as well as the entire postural set are constantly subject to visual control. We do not, it is true, "lose" our localizing arm, completely, when it is screened from vision. We "feel" its presence by means of the same kinesthetic-tactual complex that guided the localizing stylus in the tactual localization experiment (see page 436). *But only roughly*. Even when we see a target clearly before us, if our body and the localizing hand are screened from view we may miss a target spot at arm's length by as much as four inches.²⁵ Though the fovea is directed upon the target there is a loose linkage between the fovea and the hand. The eye is suspended in a "floating" muscular carriage. A pouch-shaped capsule surrounds the posterior four-fifths of the ball and contains a lubricating fluid. The smooth muscle fibers in the wall of the capsule are under autonomic innervation, and their tension holds the eye forward against the pull of the orienting muscles. Then there is the head-neck-trunk linkage, highly flexible and motile, and finally the hand itself, a swinging crane whose position depends upon a balance of contractions in the antagonists of the shoulder and arm. The member-to-member linkage in this loosely bound chain-of-command

FIGURE 91-A. Results of a study of visual localizations. Successive attempts to localize a target within a series of 10 trials, made without visual cues from the localizing hand and without knowledge of results.

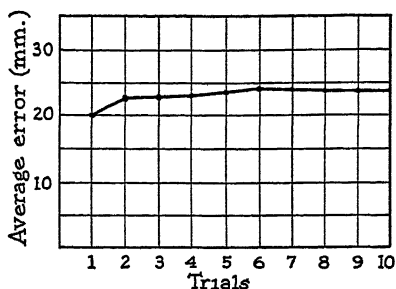
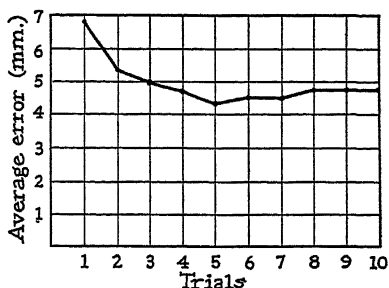


FIGURE 91-B Successive attempts to localize a target. Subjects had a clear view of target and of final position of stylus but could not see movement of localizing hand.



depends upon many muscle-to-muscle circuits. Once the retina has “spoken” the rest of the chain has to travel without further correction, and if the kinesthetic links in the chain are weak then errors can progressively accumulate as the impulses are relayed from one circuit to the next. A small error in the response to the first cue will get compounded at each stage of the relay, and as the number of relays increases the error will become progressively larger. The situation is something like that in Bartlett’s experiment (see page 446) in which the percepts of one subject were used as cues for the next.

In spite of these limiting factors, it is possible to improve localizations of this type if the subject is given full knowledge of his results and if he is permitted to maintain a steady posture. The final correction phase is “built into” the supporting posture, and in a series of localizations accuracy improves. These corrected postures tend to be rather evanescent. They will persist for a series of ten localizations, and then as a subject breaks the corrected postural set by moving about and making other spatial responses he finds that he comes back a novice, once more. Extended practice is required before anything in the way of a permanent gain is achieved.

Figure 91-B shows the drop in errors as a series of ten localizations is completed. The figures are averages for 30 ten-trial series. Figure 91-A gives the results of seven such series when no knowledge of results was given to the

subjects. The errors (25 to 30 millimeters) give an indication of the amount of correcting that is required.

In collecting the data here summarized the following procedure was used. The subject was seated before a target mounted on an easel placed at easy reading distance. The right hand of the subject held a needle-tipped stylus which he pressed upward through the target. The stylus was returned, after each trial, to a socket about 20 centimeters to the right of the target. The subject wore a specially constructed pair of goggles which completely blocked vision in the left eye and screened all vision in the right eye save one small area about 5 millimeters in diameter at the target surface. When the small opening on the right lens of the goggles was lined up with the target, the subject attempted to thrust this needle upward directly through the point of intersection of two lines. Concentric circles with diameters increasing in 1 millimeter steps enabled the experimenter to read errors directly in millimeters and to record the quadrant in which they lay. By the third or fourth trial the corrected localization adjustment had been "built in" and there was little subsequent improvement within a series of ten localizations. The built-in postures did not survive the series; but with ten of these series some subjects had acquired cues that enabled them to make accurate localizations on their first attempts. Figure 91-C shows a series of first localizations extending over 800 trials. Whereas all subjects showed a general decrease in the average errors per series of ten trials, as the experiment progressed, only about half of them showed any improvement in these "firsts"²⁶

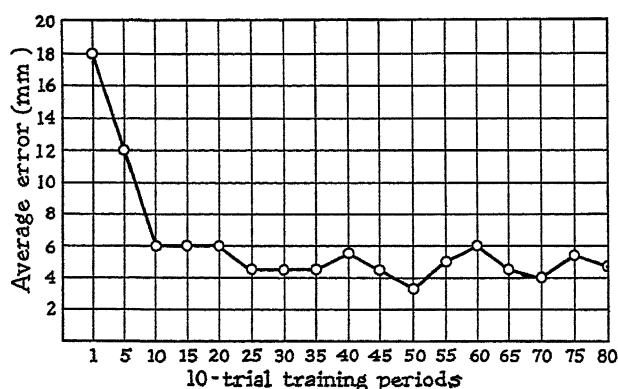


FIGURE 91-C. Successive "first trials" in an extended series of 10-trial training periods of one subject who was able to build in the controls of the localizing movement. Localizations made without view of localizing movement but with knowledge of results. [From Monk and Wilcox.²⁶]

The Perception of Motion and the Autokinetic Phenomenon

The inadequacy of the kinesthetic cues as a basis for our judgments of spatial relationships and for the control of our movements is nowhere more clearly revealed than in our perception of motion. If we return to our subject, seated in a dark room, fixating a small patch of light (approximately 1 centimeter square) at some 2 meters distance, we may assign to him the task of reporting any movement of the light. In order to help him stabilize his posture we may even provide him with a head rest and a biting board so that, seated as he is, with trunk, neck, head, in fixed position, and with a spot of light to fixate upon, he has only to rely upon the "feel of his eye muscles" to detect movement. Only if he feels that his eyes are turning in pursuit of the light will he report movement. If we require him to press a key when the movement starts and again when it changes direction, and if we ask him to draw the remembered path of the movement when we have turned up the lights, we can get at least a rough idea of the angular velocity and the extent of the perceived motion.

Although the physical stimulus is stationary, and a camera directed upon the eye of the subject indicates that the subject maintains fixation, the latter will report illusory movements that extend over an arc of twenty degrees (There are minimal shifts in the position of the eye, but these are all of a magnitude of one degree or less)²⁷ Occasional observers report illusory movements up to 65 degrees, and a number of studies have indicated that such illusions are notably subject to the influence of suggestion. A recent study of pilots-in-training found the illusion present in 500 cadets.²⁸

Onset, rate, and duration of the movement vary with the conditions imposed. Rates up to 15° to 20° per second have been reported, although the more common figure of 2° to 3° seems to characterize the ordinary conditions. If the fixation point is directly in front of the subject the movements are slight, slow, and irregular. As the point of fixation is placed toward the periphery more rapid movements (toward the periphery) are reported. If the eyes of the subject are held in this position for a period before the experiment begins, the residual tensions produce a predictable illusory movement when the central fixation position is subsequently used.*

* One is reminded, here, of the so-called Kohnstamm phenomenon, in which, following prolonged contraction of the extensors of the arm against resistance, the subject attempts to relax the arm completely. As the arm hangs loosely at the side it can be observed to rise gradually to a position 20° to 30° from the vertical. To the subject the arm seems to float upward without any voluntary innervation on his part. In the present experiment, the residual tensions are superimposed upon the contractions of the pairs of eye muscles maintaining fixation, the reactions to this complex resultant exaggerate the illusion.²⁹

The illusion is also subject to suggestion. The authoritative statement of the experimenter, "The light will move during most of the trials" will affect the frequency of the illusory movement; and even the concentration of the subject upon an anticipated direction is reported as influencing the direction of the effect.³⁰ The presence of other subjects who have status in the eyes of the one being tested, and who report (falsely) that they are experiencing one type of movement, will produce a similar tendency in the one receiving these suggestions. The influence continues to operate on subsequent experimental days when the subject performs alone. (Introspective reports indicate that the subjects may be quite unaware of the existence of such influences.)³¹

The illusion is also enhanced in states of general fatigue and by the results of prolonged eye-strain.

When a second spot of light is introduced and one of the light-spots is actually moved (at rates comparable to the illusion itself) the subject is unable to tell which is the stationary light. Actually he is more apt to attribute motion to the one he fixates upon. If the patches of light are of different size he is more apt to judge the larger one as stationary, as though generalizing from that daily experience which has taught him that houses and fields are stationary while smaller objects such as autos and animals move.

When the lights are turned on these illusions abruptly cease. Objects appear properly anchored to one another, the light is stationary against its background, and so on. Very small and very slow changes (less than one angular minute per second) will pass unnoticed and can only be inferred as the subject notes that the relationship between the object and its field has become different from that which he noted a few minutes ago. But this very slow rate of an angular minute per second is to be contrasted with the 1200 minutes per second which the kinesthetic cues alone sometimes fail to handle. Just so, in comparing the lengths of two lines, a visual difference of 1 per cent can be discriminated, whereas the tactual-kinesthetic estimation of two engraved lines will require as much as five times this difference.

The evidence from the study of monocular as well as binocular vision (in which the control of the visual field, double images, and the like, was excluded), the study of the autokinetic phenomenon and of the perception of motion with two or more lights in the dark room, as well as the study of localization errors made without visual correction in the course of the localization movement, all serve to make us skeptical about the importance of the kinesthetic cue in our most accurate perceptions. Without such cues many inter-reflex coordinations are lost. They adjust member to member, at least

roughly. With proper guidance from other cues these neuromuscular sets can be corrected and maintained so long as gross postural shifts do not interfere. But kinesthesia is clearly a poor guide for delicate adjustments when it is required to function suddenly, and without such guidance.

Conflicting and Interacting Cues

We have already observed instances in which cues act in opposition to one another. When a lens system is so constructed that the double images are reversed (as in a pseudoscope) near portions of a three-dimensional figure appear far, and vice-versa. But when the factors of *shading* and *superposition* are introduced they will overcome the force of the double-image cues. A face (or even a mask) is not seen in reversed perspective, although the conditions would determine such a reversal if there were complete reliance upon the double-image factor. Again our perception is of probable things. Also, with the stereoscope, when each of the two cards contains a single vertical line so drawn that with normal convergence there would be a slight doubling of the image (with two parallel lines seen close together) the subject sees a single line instead. The convergence mechanism adjusts automatically so that a simple, clear, visual end-product is seen, and the two proximate lines act as though some force of attraction pulled them together. The subject disregards the kinesthetic cues. If the same lines are made into parts of a complex and clearly structured field, then the doubling and the blurring appear.

In these instances we get the impression of a total constellation of factors at work, of a total integration to the spatial field, which determines how the parts function, how the separate cues will be interpreted and used. The "whole" that operates is itself an integration of many parts operating conjointly, and the experimental studies have shown us that there are distinct limits beyond which this integrated whole cannot distort the part-reactions (see, for example, the nerve and muscle transplantations).

An aura of relativity haunts the experimental studies of the spatial sense. The subject in the darkroom facing the two spots of light is hard put to it to decide which of the two is moving; and in a similar fashion we are sometimes confused as to whether it is the moon or the cloud that moves. Again, as we sit in our seat in the railroad coach, in the station, we get a pronounced illusion of motion when the neighboring train starts up, particularly if to the moving field is added the vibration caused by the heavy coaches. Or, as we gaze at the wide, flowing river, from the edge of the bridge, we experience the illusion of being on the bridge of a ship moving forward.

These facts warn us that any discussion of the localizing process must include the broader frame (the field and the posture) within which specific responses occur. The responses we are prepared to make, the anticipations generated by the just-preceding stimuli, the background provided by the supporting matrix, will have much to do with what we see. Fatigue, distraction of the attention, exclusive preoccupation with some small portion of the field, false directions, sets—anything, in short, that tends to prevent a complete integration of the totality of determining conditions—will tend to favor the appearance of illusory perceptions

GEOMETRIC ILLUSIONS: THE INFLUENCE OF CONTEXT

The influence of context is nowhere more clearly shown than in some of the geometrical illusions. For example, although the experimenter explicitly instructs the subject to pay no attention to the arrowheads in the Muller-Lyer figure (Figure 92-A) he actually is affected by the total figure. Even though he directs his fixations upon the lines, ab , $a'b'$ (and a photographic record of the eye-movements has been used to check this point) the illusion persists.* When the two figures are compared ab appears to be longer. During extended observations in which the subjects are given daily practice with the figure the illusory effect diminishes.³²

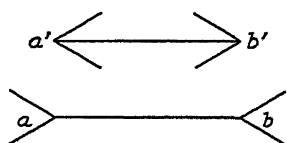


FIGURE 92-A. Muller-Lyer figure.

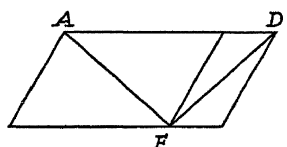
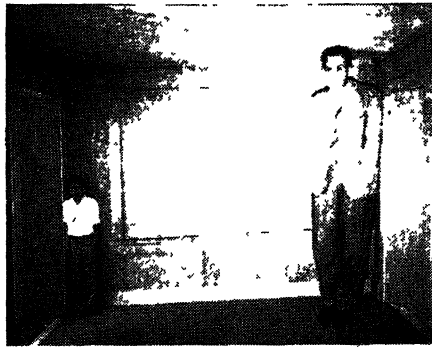


FIGURE 92-B. Sander's parallelogram. Is the line AF longer than line FD ?

Figure 92-B (parallelogram) offers another illustration of this inability to separate a part from the whole within which it is embedded. If the line AF is compared with the line FD the former, a diagonal of the larger parallelo-

* Others have shown that with exposures too brief to permit any eye-movements at all the illusion is present. Together, these studies dispose of the hypothesis that the illusion depends upon the kinesthetic cues arising from the tracing of the figure with the eye.

FIGURE 93. An optical illusion, illustrating the effect of context. Both men are the same height, 5 feet 10 inches. Their apparent heights are distorted because we tend to judge the room by the men. We tend to assume (from experience) that rooms have rectangular floors and sides. In this room the floor slopes downward toward the left, and the back wall is slanted to the left. The "smaller" man is farther from the camera. [Photos courtesy of the Institute for Associated Research, Hanover, N. H.]



gram, appears larger. Separated from their contexts, but with their relative positions unchanged, the lines appear equal. The crucial question in this case would seem to be: "What is it that determines the organization of the total figure, the grouping of the parts?" Whatever causes the line to be included as a part of the figure, sensed as belonging to a larger whole, will turn out to be the dynamic factor operating upon our reaction to the element.

In Figure 93 the factor of context is again seen at work. In this case, we tend to judge the relative sizes of two men by the background against which they stand. What we assume to be a familiar scene—a room—provides a spatial background.

Similar factors operate to produce the "larger" moon that is seen against the building or tree at the horizon. Overhead, the familiar orb may appear no larger than a silver dollar; at the horizon it is "as big as a house." Obviously, too, depth factors, poorly discriminated, are at work here. How big it is will depend upon how far away it seems. Size and distance are here seen to be parts of one dynamic whole.

The concentric sectors shown in Figure 94 provide another case in which there is a whole-part confusion. In this case, however, the instruction to

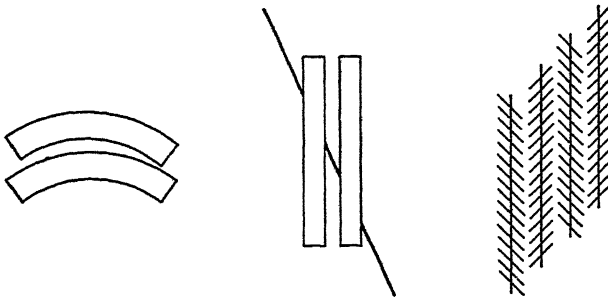


FIGURE 94. Illusion figures. Left to right: concentric sectors, Poggendorf illusion, Zoellner illusion

compare *wholes* is disregarded and the contiguity of the short side of one sector with the longer side of the other sector is permitted to affect the judgment of the areas. In the Müller-Lyer figure it was the whole that contaminated the judgment of the part. In the present instance it is the juxtaposition of the parts that contaminates the judgment of the whole. When we say that the instruction to compare wholes was disregarded, we do not mean, of course, that the subject wittingly set about comparing the adjacent sides instead of the figure-as-a-whole. He is indeed comparing wholes, he will insist. Yet he is influenced by the particular juxtaposition.*



FIGURE 95. Right angles distorted when viewed in perspective.

In the Poggendorf and Zoellner illusions (Figure 94) theorists have urged that a special type of context is at work. Because we are constantly dealing with a three-dimensional space in our daily adjustments, the lines in the geometrical figure are given a similar meaning. Roadside signs, telephone poles, buildings, trees and horizons, present us with such intersecting lines; but we have learned to refer them to the two main axes, horizontal and vertical. (See Figure 95) The context, in this case, is our own orientation

* So primitive is the effect in this illusion that Revesz was able to show it in chicks. Training them to respond to grains scattered on the smaller of two surfaces (and to disregard all grains on the larger) he then tested them on the concentric sectors. Although the chicks were now confronted with two equal surfaces they chose the one which appears smaller to the human eye.³³

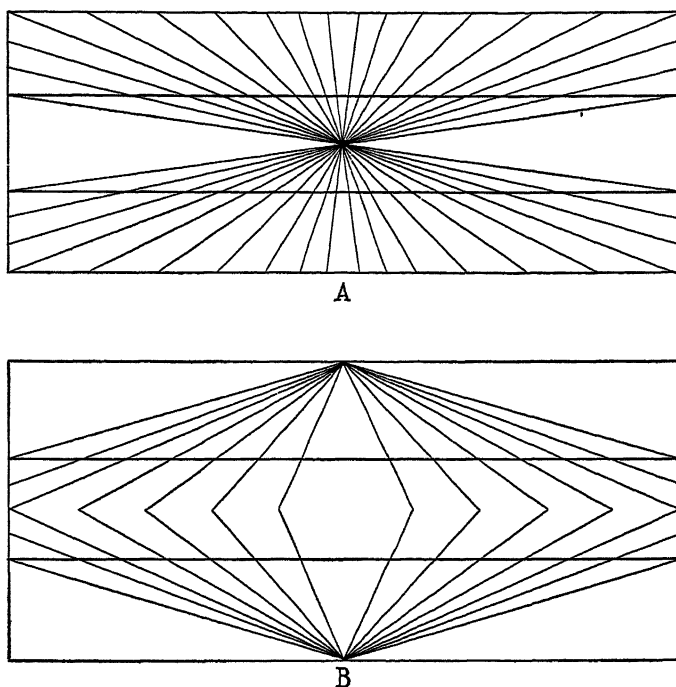


FIGURE 96. The Hering and Wundt figures.

to the gravitational field together with the habits developed in a world of human artifacts similarly oriented. Thus, in the Poggendorf figure, we would tend to warp it as we perceive it, converting acute angles, which the intersecting lines make with the figure, into right angles. This would cause an overestimation of each acute angle (and an underestimation of obtuse angles), and each half of the intersecting line would appear as though headed into the central space from a direction nearer the 90° position.

In the Zoellner figure (Figure 94) the long lines fail to converge as they should in a perspective drawing. If they were taken as representing tracks stretching away toward the horizon, or as telephone poles stretching upward above us, the drawings would mean certain directions and interspaces. As it is, the diagrams violate our neatly ordered vertical-horizontal habits. Early Chinese prints made before the conventions of perspective were adopted produce similar distortions. Hering's and Wundt's figures (Figure 96) can be interpreted by factors of this sort. We can also observe a tendency to confuse the horizontal lines with the background. For example, in the A figure (Figure 96) the two middle lines appear bowed, and they are apt to

be placed in the middle distance, whereas the lines near the border of the figure belong to the frame and are seen as straight.

Both the Zoellner and Poggendorf illusions have been found to disappear with repeated exposures. The task of making repeated estimations seems to be enough to cause the influence of the contextual factor to decline. The subjects need not be given any knowledge of the correctness of their estimates, although such knowledge would probably facilitate the disappearance of the illusion. As it is, the training must extend from 500 to 3000 exposures.³⁴

SUMMARY AND EVALUATION

We can summarize the various observations emerging from our study by stating a general principle: Estimations of size, length, area, distance, direction, movement of objects, are functions of the visual patterns presented. They are total impressions of figures in which the juxtapositions and inter-relatedness of the parts are determinative. Sometimes it is the whole that suppresses and alters the action of the parts. At other times it is the interaction of the parts that alters and distorts the whole.

Our earlier discussions of the influence of set, and past experience, should warn us that the explanatory principles cannot be confined, however, to the present figure, merely. The perception of the figure that is almost a good representation of a familiar type will be warped in the direction of the type. Past habits, familiar modes of conceiving, must be included in the whole that is dynamically operative. And the just-preceding-stimuli, the instructions of the experimenter, are also to be included.

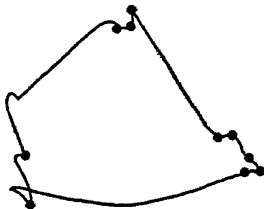


FIGURE 97. Eye movements in a visual tracing of a circle (subjectively felt as a "smooth sweep around the circle.") Dots indicate fixations [Based on G. M. Stratton, "Eye Movements and the Aesthetics of Visual Form," *Philosophische Studien*, 2 (1902), p. 352.]

One theory we have been able to discard, at least in its simplest form. As Carr states it, "the perceptible size and shape of an object are functions of the character of the eye movements involved in perceiving it."³⁵ Figure 97, which represents the actual eye movement made as the eyes sweep around a circle, is enough to show that the "smooth sweep experience" resides in some mechanism other than the eye movement. The auto that glides past

that our predicament is not altogether hopeless. We are not chained in a dark cavern nor are we isolated from the field that surrounds us. Its nature and our nature can be discovered, are being discovered. For all the terror and the mystery of existence, we do not have to wait for some transcendental leap before we see the shape of things. Deceived we frequently are. Imprisoned we are not.

REFERENCES

1. G. T. Avery, "Responses of Foetal Guinea Pigs Prematurely Delivered," *Genetic Psychology Monograph*, 3 (1928), pp. 247-331.
2. Max Wertheimer, "Experimentelle Studien über das Sehen von Bewegungen," *Zeitschrift für Psychologie*, 61 (1912), pp. 161-265.
3. H. Pieron, "Remarque sur la Perception du Mouvement Apparent," *L'Année Psychologique*, 34 (1933), pp. 245-248.
4. K. U. Smith, "The Postoperative Effects of Removal of the Striate Cortex upon Certain Unlearned Visually Controlled Reactions in the Cat," *Journal of Genetic Psychology*, 50 (1937), pp. 137-156.
5. Harry R. DeSilva, "An Analysis of the Visual Perception of Movement," *British Journal of Psychology*, 19 (1928-29), pp. 268-305.
6. From an unpublished study by Susan Knopf in the files of the Oberlin Psychological Laboratory.
7. Avery, *op cit*.
8. A. H. Riesen, "The Development of Visual Perception in Man and Chimpanzee," *Science*, 106 (1947), pp. 107-108.
9. Wilhelm Wundt, *Physiologische Psychologie*, 5th edition (Leipzig. Englemann, 1903), Vol. II, p. 514.
10. G. M. Stratton, "Vision without Inversion of the Retinal Image," *Psychological Review*, 4 (1897), pp. 341-360, 463-481.
———, "The Spatial Harmony of Touch and Sight," *Mind*, 24 (1899), p. 492.
11. P. H. Ewert, "A Study of the Effect of Inverted Retinal Stimulation upon Spatially Coordinated Behavior," *Genetic Psychology Monographs*, 7, Nos. 3 and 4 (1930).
12. R. W. Sperry, "Visuo-motor Coordination in the Newt (*Triturus Viridescens*) after Regeneration of the Optic Nerve," *Journal of Comparative Neurology*, 79 (1943), pp. 33-35.
13. P. T. Young, "Auditory Localization with Acoustical Transposition of the Ears," *Journal of Experimental Psychology*, 11 (1928), pp. 399-429.
14. A. Gallinek, "The Phantom Limb," *American Journal of Psychiatry*, 96 (1939), pp. 413-422.
15. George Riddoch, "Phantom Limbs and Body Shape," *Brain*, 64 (1947), p. 197.
16. Jack R. Ewalt; Guy C. Randall; and Harry Morris, "The Phantom Limb," *Psychosomatic Medicine*, 9 (1947), pp. 118-123.

- 16 B Douglas and L. H. Lanier, "Changes in Cutaneous Localization in a Pedicle Flap," *Archives of Neurology and Psychiatry*, 32 (1934), pp. 756-762
17. D M. Purdy, "Tactual Space Perception in Translocated Tissue," *Journal of General Psychology*, 10 (1934), pp. 227-229
18. J S B. Stopford, *Sensation and the Sensory Pathway* (Longmans, Green & Company, 1930).

F R. Ford and B. Woodhall, "Phenomena due to Misdirection of Regenerating Fibers of Cranial, Spinal, and Autonomic Nerves Clinical Observations," *Archives of Surgery*, 36 (1938), pp. 480-496.
19. Sperry, "Functional Results of Crossing Sensory Nerves in the Rat," *Journal of Comparative Neurology*, 78 (1943), pp 59-90
20. Sperry, "The Problem of Central Nervous Reorganization after Nerve Regeneration and Muscle Transplantation," *Quarterly Review of Biology*, 20 (1945), pp. 311-369
- , "The Effect of Crossing Nerves to Antagonistic Muscles in the Hind Limb of the Rat," *Journal of Comparative Neurology*, 75 (1941), pp 1-19.
- , "Transplantation of Motor Nerves and Muscles in the Forelimb of the Rat," *Journal of Comparative Neurology*, 76 (1942), pp 283-321.
- , "The Effect of Crossing Nerves to Antagonistic Limb Muscles in the Monkey," *Archives of Neurology and Psychiatry*, 58 (1947), pp 452-473
21. Wundt, *Beitrag zur Theorie der Sinneswahrnehmung* (Leipzig und Heidelberg C. F Winterische Verlagshandlung, 1862), pp 105-134
22. F. Hillebrand, "Das Verhältniss von Akkomodation und Konvergenz zur Tiefen Lokalisation," *Zeitschrift für Psychologie*, 7 (1894), pp 97-151
- , "In Sachen der Optischen Tiefen Lokalisation," *Zeitschrift für Psychologie*, 16 (1897), pp. 71-151.
- J. W. Baird, "The Influence of Accommodation and Convergence upon the Perception of Depth," *American Journal of Psychology*, 14 (1903), pp 150-200.
23. B Bourdon, *La Perception Visuelle de l'Espace* (Paris: Librairie C. Reinwald, 1902).
- 24 Jakob Bappert, "Neue Untersuchungen zum Problem des Verhältniss von Akkomodation und Konvergenz zur Wahrnehmung der Tiefe," *Zeitschrift für Psychologie*, 90 (1922), pp 167-203.
25. H. A. Carr, *An Introduction to Space Perception* (Longmans, Green & Company, 1935), p 293.
26. Mary Monk and George Wilcox, "Visually Cued Localizations without Visual Guidance" (Unpublished study in the files of the Oberlin College Psychological Laboratory)
27. J. P. Guilford and Karl Dallenbach, "A Study of the Autokinetic Sensation," *American Journal of Psychology*, 40 (1928), pp 83-91.
- 28 A. Grabiell and B Clark, "The Autokinetic Illusion and Its Significance in Night Flying," *Journal of Aviation Medicine*, 16 (1945), pp 111-151).
29. Carr, *op. cit* , pp. 314 ff.
- 30 Ernest A. Haggard and Gilbert J Rose, "Some Effects of Mental Set and Active Participation in the Conditioning of the Autokinetic Phenomenon," *Journal of Experimental Psychology*, 34 (1944), pp. 45-59.
31. Muzafer Sherif and Hadley Cantril, *The Psychology of Ego-Involvements* (John Wiley & Sons, Inc , 1949).
32. Charles H Judd, "Practice and Its Effects on the Perception of Illusions," *Psychological Review*, 9 (1902), pp 27-39
- , "The Muller-Lyer Illusion," *Psychological Review Monograph Supplement*, 7 (1905), pp. 55-81.

33. G. Revesz, "Experiments on Animal Space Perception," *VIIIth International Congress of Psychology Proceedings and Papers* (1924), pp 29-56.
- , "Experiments on Animal Space Perception," *British Journal of Psychology*, 14 (1924), pp 387-414
34. Carr, *op. cit*
35. Carr, *op. cit*, p. 381.

CHAPTER 15

Organizing, Retaining, Recalling: A Configurational Approach

When we face the anatomical facts and observe that literally millions of sensory nerves converge upon the brain, and when we consider the further fact that under normal conditions these paths are all simultaneously active, the phrase James used to describe the conscious world of the child seems apt enough for all of us. "One big blooming, buzzing, confusion," indeed!¹ There are receptors for warm and cold, for color and brightness, for sound, for pressure and pain, for odors, for taste and smell; and in addition to all the stimuli from the surface of the body there are the receptors in muscle, tendon, and joint (proprioceptors) and the receptors lying in the viscera, the walls of the arteries (interoceptors) And each sensory trunk carries waves of excitation whose rates of succession depend upon external or peripheral conditions acting at the sense organs. The timing of the discharges at the center is something over which the center has no control How is it that complete chaos does not result? How does the sensory world get its shape, its orderliness?

We found, in Chapter 14, that if anatomy sets the problem in the first place, it also provides the first answer In the very wiring that connects sense organs to effectors we find the first ordering principle The impulses entering the central connection system do not just spread everywhere and anywhere They connect with specific effector paths The discoloration on the visual surface, an ink-spot or a bit of grain, initiates a pecking movement in the

chick The moving lure causes the newt to turn and snap, the frog to dart his tongue. Head, trunk, and extremities are linked together by intercommunicating neural systems. As these reach functional maturity a stable posture can be held. Upon this postural base the distance receptors evoke various to-turnings and avoidances which are further combined and recombined as consequences are anticipated and discrete responses are fused

Physiology provides a second answer Once a response is under way there is a brief refractory period during which the contracting muscles are not available for other stimuli The incoming stimuli may enter in ever so chaotic a fashion, but a rapid, ballistic movement,* once launched, pursues its fated course: the stimuli that enter while the movement is in progress do not alter its course. Walking, breathing, talking—whatever the sequence of contractions—movements mesh with one another with a minimum of interference As one group of muscles (agonists) acts, opposing groups (antagonists) relax, clearing the path for the movement; flexors clear for extensors We see *one* organization of the ambiguous figure or the other, never a mixture of both. We inhale *or* exhale. Thus, with the very body's architecture providing a system of levers that mesh together in orderly fashion, with refractory periods and reciprocal inhibitions to keep them from jamming and interfering, in its *action* the organism is orderly

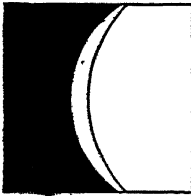


FIGURE 99 Ambiguous figure, showing how the properties of a line or a contour depend on the background This can be a concave or a convex lens, depending on whether the black or the white area is taken as the background.

There is an analogy between this orderliness determined by our action systems and the order shown in man-made machines, where pistons and levers canalize otherwise chaotic forces. The individual particles of high pressure vapor that bombard the piston head behave in a most disorderly fashion—even as the streams of nervous impulses bombarding our nerve-centers—but the levers and wheels of the engine channel their impacts into ordered motion Even the water gurgling from the bung of a barrel takes a regular pendular motion, the rhythmic “glug . . . glug . . . glug” tells us that the flow has taken on a *shape*.

Then there is the factor of *set* The impinging stimuli never find the or-

* A ballistic movement is, literally, a “thrown” movement. The burst of contraction flings the member through an arc until another contracting group of muscles catches it No correcting contractions occur during its flight

ganism wholly limp, a mere *tabula rasa*. It has its needs, its instructions, and the just-preceding stimuli have left their echoes, or traces. The incoming stimuli have to come to terms, therefore, with the conditions that already exist; like the radio receiver tuned for a particular band of frequencies, the expectant organism gives specific groupings of stimuli an advantage.

Operating in conjunction with this factor of set there are characteristics of the stimuli coming from without. The latter are not simply equivalent. Some are prepotent, like the burning intensity of heat, the painful cut, the crashing sound. And they are grouped in space and time; there is an order in the field itself.

Finally, there are the residues of older, earlier, organizations. The traces of past habits provide handles with which we greet the new field. As a result, the buzzing, blooming, confusion that greets the novice seems to slow up and take on an order as he learns to resolve his tensions by efficient action. The clicks, gutturals, and aspirates of the rapidly uttered speech of the native become deliberate and understandable speech as familiarity stretches the span of our apprehension, and learning organizes the higher units which carry meanings. We no longer hear the parts, as parts, but grasp the larger units as such. We react to (and search for) groups, relations, patterns. So the telegrapher receives words and phrases, and not the discrete letters, not the clicks, dots, and dashes. So the experienced typist's eye reads words and phrases as it races ahead of her finger movements; and the movements themselves are phrased and organized in higher units, as definitely as those of a skilled pianist (whose body sway sometimes betrays the postural phrase on which the key-strokes ride). In each case it is the habit-of-responding that groups and organizes the disparate pulses coming in from the field. The novice sees little but "skin and squash" in the caterpillar, whereas the trained dissector sees an exquisitely ordered architecture. The retinal cues are the same. The distracted machinist's helper who enters the shop for his first day of work is tense, confused, and the maze of whirring belts, whining saws, thumping presses has no order. Prepotent though the stimuli are, they are timed in confusing fashion and his responses are not yet able to organize them. Yet as the days go by, his tensions subside, negative adaptation to some of the cues sets in, and ordered adjustments to others guide him in longer arcs of smoothly functioning behavior. Again, coördinated actions order the world; and in this case it is *learned* action. It was a process of learning such ordered actions that now enables the appreciative critic to hear the patterns of symphonic music. One is almost persuaded that with sufficient effort he might learn to appreciate the irritating distortions and disorder in modern art.

If we think of man's human milieu as a huge societal maze within which interpersonal pressures guide our habit formation, we shall understand how it is that the individual comes to order the world as his fellow-tribesmen do. In India he may sense in the goat, the banyan tree, or the low-trailing cloud, some brother-spirit, and he orders his own behavior in a field of spiritual forces. In Bali he may assign to the points of the compass a special spiritual significance and see that which is geographically higher and lower as a mark of caste and social significance. These, again, are learned actions, the culture has regulated the reinforcements (rewards and punishments) until it has—in shaping the *actions* of young learners—shaped their way of perceiving, of ordering the world.

The organization process is here explained in terms of five factors:

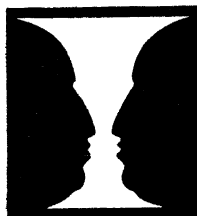
1. The patterns of stimulation (timing, spacing, relative intensities)
2. Inherited anatomical connections (reflexes and inter-reflex connections, reciprocating innervation.)
3. Physiological factors. facilitation, inhibition, refractory phase, and the basic need-states (hunger, tumescence, fatigue, and so on)
4. Sets, directions, anticipations, which arise out of an immediate past: the after-effects of truncated actions, the emotions of fear, rage, love, and the like
5. Habit organizations, ordered responses which have been shaped in the past contacts with the milieu, both personal and impersonal.

THE SHAPE IN THE STIMULUS FIELD

Of the five factors we have named, the Gestalt psychologist has been most concerned with the first. And there is a certain reasonableness in the emphasis. After all, the stimuli are given. *Then* the perceiver can add his meaning, his reflexes, his previously formed associations, his fusions of the parts. But we have too often glossed over a problem that is concealed in this first stage.

Consider the *what* we have to isolate, the figure, the thing that stands out from the background, the structure that is detached from the matrix. In a sense this is a pre-perceptual thing: before associations can be called up, before reflexes can be discharged, something has to stand out, something has to be identified, segregated from the "blooming, buzzing, confusion." In the row of letters 0000000xx0000000, the x's stand out, belong together. In Figure 99 one half of the field is segregated from the other, all of the black flowing together and forming a unit, all of the white forming another unit. Or

FIGURE 100 Rubin's vase figure [After Rubin. From S. I. Franz and K. Gordon, *Psychology* (McGraw-Hill Book Company, Inc., 1933).]



in Figure 100 we see a white vase against an all-black background, or two black profiles against an all-white background. In short, as the perceptual response develops, something stands out, parts with similar properties flow together, a shape is formed. The perceived figure, that which possesses the shape, that which catches our attention and controls our responses, stands out in front of a loosely organized and indifferent background.

All of this occurs prior to the evocation of any associations. In fact, although some of the stimuli that form the background have associations the latter are not evoked at all. The background is like the not-seen aspect of an ambiguous figure. In Rubin's vase-figure (Figure 100) the profiles do not appear as profiles when the vase is seen; and if it is the vase-organization that is seen, the observer will not be reminded of Mr. Dreiser (because of similarity of profiles) for the simple reason that the contour of the vase is *not* the profile of a face. The contours are thus seen to belong to the figure, the background is amorphous, shapeless.

Thus we are reminded that the events in nature that impinge upon our receptors are not themselves mere agglomerates, mere additive combinations of heterogeneous atomistic happenings. Like the shape of the soap bubble, so neatly spherical, which represents a configured coming-to-terms of internal air pressure and the cohesive forces joining the molecules of the soap film, the interacting forces set up within us by the *patterns* in the stimulus-field achieve an equilibrium, construct a shape, because the particular end-result offers the most stable distribution of forces. So the crystals, the clouds, the melodies, the trees, the whole world of objects are ordered in pre-existing shapes, in nature.

When these shapes fall upon our retinas, or our ears, or our skin surfaces, they activate thousands of sensory elements, each segregated from the others. The impulses race to the center along insulated trunk lines and when these sensory paths converge and interact within our action systems the shapes, the structures isolated in the perceptual field, appear. We observed such fusion in the phi-phenomenon. Fusion occurs, as a matter of fact, every time we look into a visual field with one eye closed. On the retina there is a blind spot where the optic fibers leave the eye. Any stimulus falling upon

this area will produce no effect. (See Figure 88) Yet, perceptually there is no blank spot in the field. The smooth surface of a buff-colored wall has no area in white, or gray, or black, corresponding to this area where there are no retinal cells to be activated by the stimuli. There is a filling-in process somewhere along the line. As in the phi-phenomenon, the nearby processes have fused, creating a continuous field.

Now in such a perceptual field, with its proximate and remote areas, there will be forces of attraction and repulsion, near-effects and remote effects.* Even where points in the visual field do not fuse, and are seen as two, they are judged as nearer than, in fact, they are. A second touch stimulus will alter the apparent location of a first one. In the rows of dots and lines in Figure 101 the near pairs join up to make perceptual units.

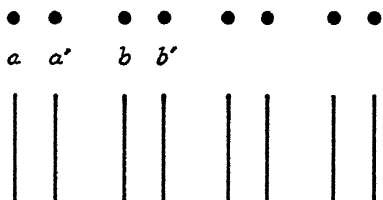


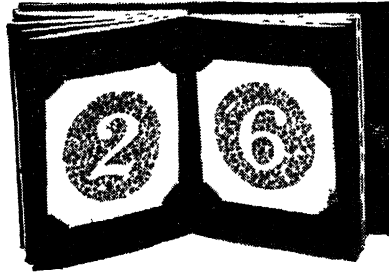
FIGURE 101. Dots and lines that fall into natural groupings—*a* with *a'*, *b* with *b'*. Note that it is difficult to group *a'* with *b*.

Then there is the factor of *similarity*. In the Ishihara color chart (Figure 102) a figure can be seen by the subject with normal color vision; the similarly colored dots fuse to form a numeral. Examples could be multiplied in which similarities of color, brightness, and direction of motion produce similar figural effects. Seated in the railway station waiting room, one looks

* Whether this fusion occurs at the cortical level, or whether it is an inter-reflex affair involving sub-cortical structures and the peripheral neuromuscular apparatus need not concern us here. We can observe relationships within the perceptual field without arguing about the nature of the physiological substrate. If the logic of Chapter 14 is correct these deeper levels will involve the entire neuromuscular system. At the present level of analysis we need not debate the question. The reader needs merely to remember that where we speak of *action systems* the Gestaltists (and most neurophysiologists) will speak of cortical systems.

Sperry sought to test one form of the neural hypothesis by making a series of intersecting knife cuts through the gray of the cortex (in the monkey) leaving the principal masses of cells undisturbed but presumably interfering seriously with chemical, electrical, and neural transmissions over this surface tissue. Rapid recovery of function of the arms (whose cortical areas were cut)—including fine manipulations, voluntary movements—showed that the blood clots, scar tissues, and interruptions in the surface network, had not interfered with the organization of either the sensory field or the motor apparatus. The recovery was so prompt (within a few hours in those animals where the lesions were confined to the surface of the cortex, within ten days for deeper lesions) that it could not be attributed to regeneration. The evidence would seem to demand an integrative process that utilizes the deeper levels.²

FIGURE 102. Charts used as a test for color blindness. In the field of dots of varying colors and brightnesses, the normal eye sees the numeral formed by dots of a certain color. [From C. H. Stoelting Co.]



out upon a mass of humanity weaving to and fro in formless fashion. Suddenly a little family group detaches itself from the mass and is seen moving toward one of the exits. The stimulus-patterns that call out our perceptual responses are just such detached groupings which focus our responses upon a figure, crowding all else into a less-organized background. This process of segregating patterns exists even before a background of familiar meanings can be called upon. We are forced to extend the concept of inter-reflex fusions to colors, shapes, patterns. These forces must exist in the absence of meaning and prior to learning. How, indeed, could we reinforce the reaction to a shape if there were no shape-reaction in the first place?

A neurological experiment performed by Klüver and Bucy will serve to emphasize the fact that fusions exist apart from meanings. An operation upon the temporal lobe of a monkey (bilateral temporal lobectomy) produces a loss in ability to recognize objects (agnosia). Objects can be located but are not recognized. Upon recovery from the operation, the animal approaches all objects without hesitation and without discrimination, grasping them even while they are moving. Each object is promptly conveyed to his mouth, whether feces, snake, nail, steel nut, a bit of food, a piece of soap. He has no difficulty in isolating and localizing what is presented; but he recognizes none of them until they touch his mouth zone.³

The case of congenital cataracts A similar distinction between the act of localizing and segregating a whole and the act of identifying an object comes from the study of adults who have just had congenital cataracts removed. Although from the standpoint of the one who searches for a clear-cut answer to the nativism-empiricism argument the evidence is somewhat unsatisfactory, all observers seem to agree that when the experimenter asks the patient whose bandages have just been removed, "What is that?" the patient knows the meaning of the question and can isolate the *that* even when he is not able to identify it. Stratton describes a patient who could not identify a familiar cat. Another thought that a large bottle might be a horse.⁴

THE DYNAMICS OF SHAPE

While we have been discussing the factors of *nearness* and *similarity* we have tried to choose examples in which simple sensory conditions seemed to control the linking up of parts into a unified whole. It is possible to demonstrate that similar *shapes* also have an affinity. In the phi-phenomenon the first figure may be followed by two figures, one placed on each side of the first. With suitable exposures and distances a double-phi, a movement in both directions, can be produced. But if the figures are given definite shapes it can be shown that there is a preference for a movement from the first shape to its similar.⁵ This latter example implies that in addition to relatively simple inter-reflex effects there are much more complex relations within our action systems.

The Ageing of Figures

Experiment reveals that figures age, and that as they age their properties change. If two rectangles, as in Figure 103, are arranged so that a fixation point lies immediately between them at *x*, and if one of the rectangles is covered with a white screen during a fixation period of 3 to 5 minutes, at the removal of the screen the two figures will be seen to be of different sizes.

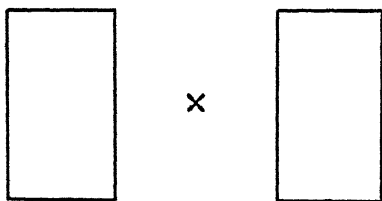
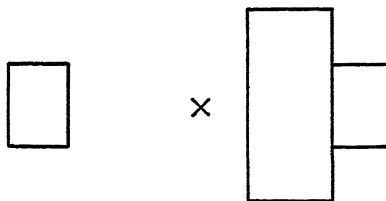


FIGURE 103. Rectangles and fixation point (*X*). [Based on Kohler, p. 85⁶]

The old figure appears smaller, farther back, and with pale contours. That this ageing is not due to some mere retinal change is easily proved: one eye can be used in fixation while the other eye is used in the test. The shrinkage persists. Thus we know that we are dealing with a property of a response system rather than with a mere sensory aftereffect. (As was indicated earlier, the Gestalt theory conceives of these changes as due to properties of cortical action.)⁶

The experiment can be complicated in such a way that the figures which are compared occupy positions affecting other retinal areas. For example, in Figure 104 the right test object appears smaller than the left. The field of the fixated figure (the large rectangle), being contiguous with the area of the right test object, has influenced it to a greater degree than it affected

FIGURE 104. Kohler's rectangles, showing spread of effect of fixation. [Based on Kohler, p. 94.⁶]



the more remote (left) test object. A program of experimental investigation can be conceived in which the "lines of force" within the perceptual field will be carefully mapped, and the quantitative laws of this "spread of effect" determined

A figure must also be conceived as having its own internal forces. Just as crystals or soap bubbles take the shape they must, achieving equilibria that resist external attempts to deform them, so the shapes in our action systems will have their own powers and internal stresses. In this respect some figures will be superior to others, their *goodness* consisting in their persistence, their integrity against deformation (and this goodness would also be shown by the tendency of all similar but not identical constellations to assume precisely these forms).

Experience vs. "Goodness of Figure"

We need to guard ourselves against overshooting the mark at this point. The Gestalt emphasis has indeed helped us to see that the role of habit-factors and preparatory sets can be overworked, there are real organizations in nature which force fusions in our response systems. But as in the nature-nurture controversy (of which this is a particular form) we need to steer a course between either extreme.

The Gestalt principle can be stated thus: All configurations tend to become as good as possible. That is, the forces within a field will find equilibria, steady states, that are precisely of the same order as those balances of forces portrayed by the crystal, the soap bubble. And just as a soap film does not have to have "experience" in order to find that balance between the forces of cohesion and internal air pressure, so there are shapes in our action systems prior to experience.

Köhler illustrates the point by an appeal to the familiar constellations of the starry heavens.

"If we look up at the sky on a clear night, some constellations of stars are seen immediately as belonging together and as detached from their environment. Cassiopeia is an example, the Dipper is another. In past ages people

saw the same groups, as belonging together and at the present time children do not need instruction in order to perceive them as units.”*

The example would have greater force as proof that experience is not operative in this case if we did not also know that the Brazilian Indians see Orion as a huge platform for drying mandioca, or that the South Sea Islanders see fish, the Accadians a heavenly flock of sheep, where we see other forms. Other star groupings than those we now commonly use have been proposed from time to time, the units that seem *natural* to us being broken up, their components distributed to other configurations. Some units recorded in the history of astronomy were evidently so dependent upon a particular history that their proposers never found takers for them, and these promptly dropped into oblivion. Moreover, since Köhler does not specify the age of the hypothetical children in his argument, we do not know whether their grasp of the visual form antedates or follows their familiarity with dippers, chairs, fish, and the like. When a common culture preserves the same type of artifacts that existed in ancient Sumerian culture, we need not resort to “sensory dynamics,” or “dynamical self-distribution,” to explain a continuity of reference to such objects. Again we are confronted with a Gestalt-problem rather than an explanation or a solution.

In the tachistoscopic experiment we learned that with brief exposures it is easier for the subjects to organize, grasp, reproduce, *familiar* constellations. Four or five words in a meaningful sentence, two familiar words in a piled phrase, four or five single letters in meaningless combinations, could be taken up and reproduced. If we use the number of letters as our scale, the skill of the perceiver in organizing and retaining the units increases with the arrangement of the parts into familiar “higher units.” When the parts of letter and number symbols are shown, as in Figure 105, our ability to grasp is even more limited. The speed with which we organize the printed symbols as we read depends upon the familiarity with the word forms, the content or meanings they symbolize, and even upon the familiarity with the type face that is used.

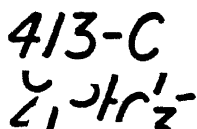


FIGURE 105. The familiar organization of letter and number symbols, contrasted with an aggregate of parts

* From *Gestalt Psychology*, by Wolfgang Köhler, p. 154. Copyright 1929, Horace Liveright, Inc. Copyright 1947, Liveright Publishing Corp.

After such objections have been uttered, however, it is to be emphasized that they are objections to an overemphasis upon the factors of dynamical self-distribution operating in the present field, and must not be interpreted as a denial of the importance of these factors, or of the value of the Gestaltist contribution. A sober contemplation of the complexity of the factors that determine the organization of the perceptual field makes us realize, not merely that no simple set of conditions will ever cover the case, but that psychologists are confronted with an extremely difficult task in setting up any formulation, however complex, that will enable them to predict the organizations that will appear. The Gestalt laws, themselves—if indeed, at their present non-quantitative stage of formulation they can be said to fulfill the conception of law current in the physical sciences—do not lend themselves to the demands of prediction. After the fact, we can understand what has transpired when we see that in a given case it has been a matter of simplicity of the figure, in another case a matter of continuity of line, and that in still others the factors of symmetry, regularity, unification, inclusiveness, good articulation, have been at work. About the best that can be affirmed is that each constellation of externally initiated forces will present a unique problem in dynamics, and that, as the basic law runs, they will work out an equilibrium. If the *good* figure is what the subject sees when such equilibria have been worked out, then it is obvious that “configurations will tend to become as ‘good’ and as stable as possible.” But until we develop quantitative laws for these equilibria, and develop some way of studying the precise rules that govern interactions of the factors, we have done little more than to state the Gestalt problem. Nor are the cortical dynamics, which Gestaltists so frequently posit, of much help in working out the theory, since so little is known of the intimate nature of cortical physiology. Nor is the tendency to neglect the factor of past experience, the influence of the culture, likely to prove helpful in the discovery of these laws.

Besides their most general statement, the Gestaltists offer a number of subordinate laws. The *law of closure* describes the tendency to see continuous and complete figures where all-but-complete ones are presented as stimuli. Thus, if we were working with two-point thresholds, either in touch or vision, we would discover one set of threshold-values if the two points were presented as isolated points; a different set of values would appear if they were offered as the termini of solids or line drawings that constituted all-but-complete figures. We saw this tendency to fill in, in the case of the blind spot. The tendency toward closure operates in this case so as to complete any figure whose lines cross this area on the retina. No discontinuity is sensed.

Again, the law of closure would be illustrated by the tendency to complete a rhythmic pattern, to resolve a sequence of chords, to conclude a melody. In these cases, however, the law would be stretched to cover a territory where highly elaborate and specific traditions have operated to train the individual's expectancies. Here it is the field evoked by the incomplete *familiar* figure that creates the tendency to closure.*

Another Gestalt principle is illustrated by the assertion that "other things being equal" the figure that is formed will include as much of the field as possible, that figures including more of the field are more stable. We say, for example, of one scientific theory that it is *better* than another when it includes and orders more of the data. We think of scientific progress as arising out of the conflict of rival theories when a new discovery shows how the apparent contradiction can be resolved in some higher, more inclusive organization. Inclusiveness, however, often works against simplicity, continuity, or "good articulation"; and it is precisely the "goodness" of our limited half-truths, and partial insights, that makes it so difficult to see more truly than we do. Here, again, it is a case of opposed principles, contrary forces; and we are confronted with the Gestalt problem †

A Summary of the Figure-Forming Problem

If we review our discussion of the Gestalt problem up to this point, we shall find that characteristics in the stimulating field seem to control the organizations that we make: (1) The stimuli that are *contiguous* in space and time tend to be joined in the figure. (2) Objective *similarity* in the parts favors the organization of those parts into one whole; and in this factor one would include similarity in color, shape, motion, intensity. (3) Since the moment of time observed cannot really be sliced off and segregated from the just-preceding period, we have to add the principle of *objective set*. The new tone will be higher than, stand out from, the background. The new element may fall within the perceptual field of the last seen figure, and the traces of

* This is a far cry from the kind of dynamic self-distribution in a field of cortical action potentials. The field the gestaltists have traditionally posited is one in which shapes are determined by electrochemical forces of attraction and repulsion operating in a here and now.

† As we reflect on the findings of psychopathology, where it is abundantly demonstrated that all of us have self-contradictory characters, systems of repressed tendencies quite contrary to our regnant beliefs, it becomes apparent that in forming that larger pattern, our life style, it has been easier to make two patterns rather than one, and that inclusiveness and integrity are seldom achieved. Perhaps the figure of our existence *should* be such an inclusive one. The facts imply that the forces of segregation are greater than those of inclusion. The contradictories in human nature seem to be reflected in a certain self-contradictory quality in psychological formulations.

the latter will continue to operate within the newly constituted field. Such objective sets may serve to reinforce or to break up figures currently forming under the dynamics of the moment. (4) The larger, surrounding, loosely articulated or undifferentiated background will tend to enclose, as a figure, the sharply differentiated, brighter, more intense, articulated organization upon which attention and awareness are centered.

As for the figure itself, there is a tendency toward closure, toward inclusiveness, toward good continuity and articulation; and at the same time the good figure tends toward simplicity, symmetry, regularity. The good figures which realize these tendencies resist distortion; and they may be regarded as equilibria toward which any figure that tends to approximate them will move.

THE IMPLICATIONS OF GESTALT THEORY FOR LEARNING, MEMORY, AND RECALL

The Gestalt interpretation of mental events affects our conception of the adjustment of the organism to its field at three points: (1) at the point of *imprinting* (perceiving, learning, reacting); (2) at the stage of *retaining* or storage of impressions; and (3) at the point of *recognition* and *recall*.

Let us consider the process of imprinting, first. There are always two learning situations to be kept in mind. the geographic situation which the experimenter has arranged, the procedure he describes in his notes, and the situation for the learner, the learning situation as it is viewed by the subject. Pavlovian conditioning may seem to the experimenter a simple matter of pairing the sound of the metronome with the giving of meat powder, and all extraneous cues may have been excluded by the four-foot-thick concrete walls; but that has not shut out the animal's terror, nor prevented his mad scramble to escape, nor excluded his reaction to the situation as one in which he is being confined, punished. Instead of standing calmly and making an intelligent association between the two significant events he struggles, snaps at the harness, yelps. How can the faint sound of bubbling water and the highly irrelevant meat powder form a figure in such a situation? Though the stimuli are paired, the perceptual responses are in a state of chaos, and no clear-cut organization is imprinted. Not until the dog has become adapted, not until there is a quiescent and attentive posture, is it possible for perceiving and learning of the type the experimenter hopes for. Prior to this the stimuli are as completely lost to the subject as a lullaby in a

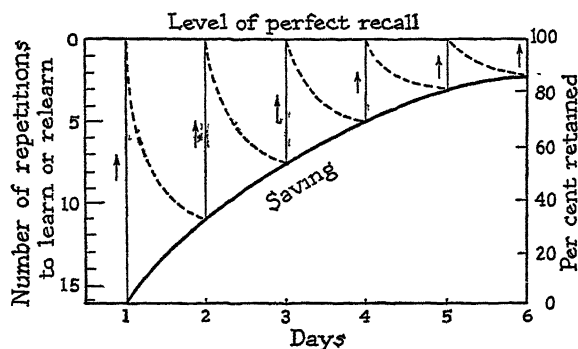


FIGURE 106. Practice, forgetting, and re-learning. Graph based on data from Ebbinghaus, whose study of learning and retention of lists of nonsense syllables indicated that forgetting was made slower by increasing the repetitions during the learning phase. In the

study here summarized, the subject learned nine lists of nonsense syllables to the point of perfect recall. Each day the same list was learned. As the days of practice went by, fewer and fewer repetitions were required. Descending curves show the rate of forgetting after each perfect recitation. A "Saving" of 100 per cent would indicate perfect retention. [Based on R. S. Woodworth, *Experimental Psychology* (Henry Holt & Company, Inc., 1938), p. 59.]

boiler shop. And conditioning theory has had to recognize the fact, adapting its training procedure until *reactions* are properly controlled.

The Gestaltist is prone to discard all forms of association theory. He has argued that it is not enough to have two ideas present in the mind at the same time, as psychologists have assumed from the time of Aristotle. New organizations, new conceptions, involve new *relationships*. And of these contiguity is perhaps the least important. Whether we deal with simple sensory cues (dots, spots of color, lines) geometric figures, or more complex ideational patterns, we shall be confronted with the problem of shape, of field forces, of the dynamics of organization. There will be forces of attraction and repulsion, stable and unstable configurations, disintegrating and intruding forces, boundaries that are strong or weak, rapidly ageing figures which break up and surrender their parts to a stronger organization. The mere juxtaposition, the mere spatial and temporal contiguity, is not enough.

At this point the Gestalt analysis makes two lines of attack upon traditional learning procedures. The latter, Gestaltists argue, have neglected adequate emphasis upon (1) the field forces, the interrelations within the presented material, and (2) the forces within the learner, himself. Although some of their criticisms have been met by a learning theory that has included both motivational and perceptual factors, it will be of advantage to review the Gestalt arguments here, since so many of our current notions of memory and recall were developed on the basis of traditional associationist theories and procedures.

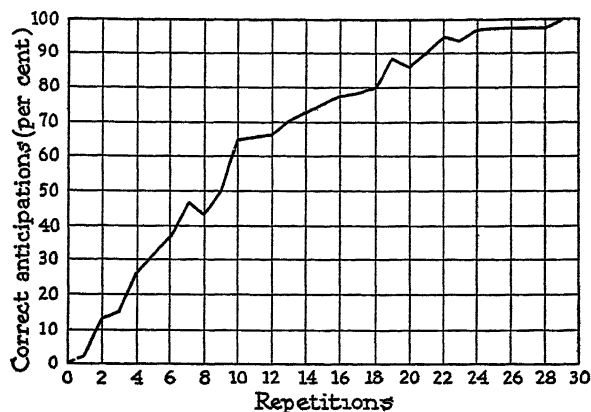


FIGURE 107. Learning curve for recall of the sixth number in a list of 10 three-place numbers [Data from E. S. Robinson and M. A. Brown, "Effect of Serial Position upon Memorization," *American Journal of Psychology*, 37 (1926), pp. 538-552.]

The Gestaltist Criticism of Learning Materials

The early formulations of the laws of memorizing, retaining, recalling were founded upon work with nonsense syllables. These materials were chosen because they were unfamiliar; there was an unlimited supply of standard parts of equal difficulty.* One can select a group of 20 syllables that is as unfamiliar and meaningless as another. Learning Method A can be compared with Learning Method V, using these standard lists of nonsense syllables in a way that would scarcely be possible with meaningful materials. A poem, for example, would contain ideas interesting or familiar to one subject, indifferent or unfamiliar to another. And a second poem would be of indeterminate difficulty. Meaningful materials could not be standardized for all subjects. In selecting meaningless materials the experimenters hoped to avoid such difficulties. In spite of this gain they unwittingly chose the poorest possible materials from the standpoint of configurational factors. The dynamic properties of a pair of nonsense syllables are about on a par with those of a pair of marbles dropped on the floor. They do not make good figures. The organizations, if any, have to be imported, imposed. The curves of learning and forgetting achieved with such materials—and the syllable lists can be learned—have to be understood in the light of these facts.

The typical curves (see Figures 106 and 107) indicate that learning is a

* See, for example, the list of nonsense syllables used in Reed's experiment (page 585). These three-letter syllables are constructed according to a mechanical formula, and then meaningful combinations are carefully culled out.

matter of patient, plodding, repetition—with *more* repetition (that is, over-learning) the only guarantee of long-term retention. Is it surprising, the Gestaltist would ask? And is it surprising that the forgetting sets in with a rush, once the patient, plodding rehearsals are over? How can the learner use that wit, that intelligence, that organizing power that is his birthright, when the very materials make him into a “Dummkopf” by their very neglect of those field forces, those meaningful aspects that would make it easy for him to grasp, unify, and retain? Similar criticisms were directed at the mazes, the puzzle boxes, the wire puzzles. Perversely, the experimenters seemed intent upon finding materials that precluded the most efficient learning. The studies were terribly objective—and terribly abnormal, atypical, meaningless.

The Learner as Organizer

With reference to the second line of attack the Gestaltists join forces with the group that has been insistent upon the importance of motivation. Even in the early studies with nonsense syllables it had been discovered that there is a *memory attitude*, that merely reading materials over is not the same as reading them with the intent-to-learn-and-retain for some later occasion of recall. The story is told of the foreign student who was participating in one of the nonsense syllable experiments in a Swiss laboratory. Because of the language barrier he had not quite grasped the significance of the procedure, and although he had followed the direction to read the syllables aloud as they were shown he had made no attempt to *register* the impressions, to *set himself for later recall*, to anticipate the second member of a pair when the first member was shown. He had obeyed the requirements as he understood them and had responded to the stimuli, after a fashion. When he was finally questioned as to why he never anticipated the second members of the syllable pairs, he was much embarrassed. He had not understood that he was required to *associate* the syllables. The Gestaltists also like to tell a companion to this story. After learning syllable pairs (such as *baf-nim*, *kal-lec*, *zub-woc*) under clear and explicit instructions, a subject was suddenly asked to tell which syllables had regularly followed the second members of each pair (they would have had to give *kal* as a response when *num* was exposed, and so on). The subject immediately protested, “I didn’t know I was supposed to learn *that* association.” The Gestaltist argument runs thus: the figure formed is the figure retained.*

These illustrations do not make airtight arguments for the exclusive role

* In order to demonstrate such a point an experimenter would control the spatial and temporal succession. Thus the interval between each of the syllables could be fixed and each syllable exposed at the same aperture, the grouping in pairs being a functional grouping imposed by instructions.

of configurational forces. Investigators who worked with nonsense syllables found that, when the subject learned the syllables in one sequence, many mediate associations were formed. Unintentional bonds were established. Learned in the forward direction, the list could be relearned in the reverse direction with fewer trials than would be required for fresh materials. Constructing new lists out of the first, third, fifth, and so on, it was found that remote bonds had been established. But these by-products are not present in any impressive amount.

On the positive side this emphasis is clearly an important one. There is no question that the factor of organization makes for rapid learning and more efficient retention. Even the bare fact of mechanical grouping of meaningless materials like nonsense syllables increases the efficiency of learning. The experimenter may facilitate this by asking his subjects to repeat the list with a trochaic accent, to isolate each group by interpolated rest-pauses; or he may assist the subject by coloring each group with a different ink. Most subjects will hit upon some form of the grouping technique. In fact it is very difficult *not* to import some sort of rhythm into the process. Katona is of the opinion that a large share of the individual differences which he found among memorizers can be accounted for by differences in their skill in applying organizing devices. Within such groupings inter-syllable bonds are formed, the group has a sort of structure. And these inter-syllable forces can be demonstrated. When new lists are formed out of these same syllables, but with rhythmic grouping changed, even when the same syllables and the same objective sequences are undisturbed, the relearning showed no savings; but where the groups are shuffled and the intra-group relations preserved, as much as 35 per cent is saved in the relearning.⁷ (Thus if it required 20 trials to learn the first list and 13 trials to learn the reconstituted list in which the measures were kept intact, the ratio $\frac{7}{20}$ represents the *saving*.)

Katona's Experiment

Katona performed an ingenious experiment to demonstrate the effects of different types of grouping. Four groups of college students were assigned the following tasks:

Group I. Two series of equally spaced numbers were written upon the blackboard

2	9	3	3	3	6	4	0	4	3	4	7
5	8	1	2	1	5	1	9	2	2	2	6

The subjects were instructed "The numbers are not in random order. They have a principle. Try to find it. I shall give you one cue: both rows have the same principle."

Group II. Two series of grouped numbers were written upon the blackboard.

293	336	404	347
581	215	192	226

The subjects were instructed: "I want you to learn the following series by heart. In memorizing the best method to use is rhythmical grouping. Therefore you should learn: *two* nine three, *three* three six, etc."

Group III. Two amounts were written upon the blackboard.

\$2, 933,	364,	043	47	in 1929
\$5, 812,	151,	922.	26	in 1936

The subjects were instructed: "For the sake of a psychological experiment I want you to learn a few facts on Government finance. The expenditures of the Federal Government have recently increased rapidly. The amounts are given on the blackboard. Please repeat the numbers aloud five times in order to know the exact amounts of the Federal expenditures in 1929 and in 1936."

Group IV. Two amounts were written upon the blackboard

\$2,933 million	\$15,192,226,000
\$5,812 million	\$36,404,347,000

The subjects were instructed: "I shall now give you a short lecture on Government finances. Please listen carefully. In recent years the expenditures of the Federal Government have risen rapidly." (The following 5 minutes were spent in a repetitious harangue on indebtedness and expenditures in which the figures on the right were referred to as the debt of the government in '29 and '36 and to the figures on the left as annual expenditures for those same years) *

The results shown in the table on page 537 indicate that those who discovered the principle were vastly superior both in the early and in the delayed recall, particularly in the latter. The one principle of organization unified the entire arrangement of the figures. Thus, for the second number:

5	8	12	15	19	22	26	(Digits to be learned)
3	4	3	4	3	4		(Differences between contiguous numbers)

* George Katona, *Organizing and Memorizing* (Columbia University Press, 1940), pp. 188-189. Used by permission.

The relationship of the differences is such a simple pattern that, once grasped, all the subject has to learn is the first and the terminal number. And no repetitions are required, nor does the subject want them. The memorizers who learned by a mechanical grouping, or who repeated the series five times (Groups II and III) did fairly well on the early recall but failed in the delayed recall test. When another group of ten adults was tested by this rote-learning procedure and tested immediately after the repetitions, nine out of ten could repeat the list without error; but when they were asked a week later to reproduce the list (and they had not been forewarned that delayed recall would be tested) they objected strenuously, arguing that the demand was entirely unfair. To these subjects it did not seem to be the sort of thing that the mind could possibly be expected to retain.

Percentage of Subjects Who Made Correct Reproductions (Katona)

	INTERVAL OF DELAY	GROUPS	I	II	III	IV
Test	30 minutes	38%	33%	20%	0%	
Re-test	3 weeks	23%	0%	0%	0%	

A Hierarchy of Meanings

It would appear from what we have said that memory materials and learning methods cannot be easily divided into two sharply differentiated types—one in which configurational factors and active perceivers can produce organizations (and in which mechanically formed associations have no role), and a second type in which the factor of contiguity (coupled with many repetitions) is responsible for learned integrations. *Some* organization is always present. The two types appear, rather, as limits, as the two ends of a continuum. Learning materials have every degree of clarity and form, and it would appear that the better the organization, the richer the intrinsic relations within the figures, the fewer the repetitions that will be required and the longer the effects will be retained. Learners grow efficient as the configurational principles are realized. There is objective evidence for what the artist has called *memorable form*.

Moreover, it is true in a very real sense that the figure determines *what* is remembered. William James once illustrated the point with an instance in which a school teacher, flattered by the wrapt attention a small boy had given during class, met final disillusionment when the child told her, "I looked at you all the time, and your upper jaw did not move once!" And James added, "That was the only fact that he had taken in."

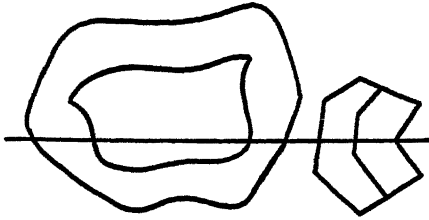


FIGURE 108. Note the figure 4 embedded between the two forms. Each of its sides "belongs" to one of these forms or to the intersecting line. Robbed of its constituent parts by the "forces" of these other figures, the 4 requires supporting emphasis if it is to be seen [From: *Gestalt Psychology* by Wolfgang Kohler, p 200. Copyright 1929, Horace Liveright, Inc Copyright 1947, Liveright Publishing Corp.]

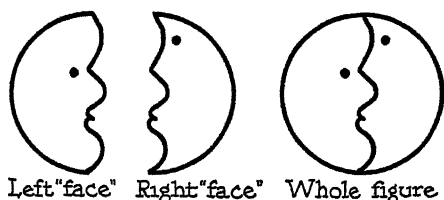
What kind of figures are forming in the mind of the bored college student as he listens to his professor droning on? He looks with a mixture of guilt and contempt at the eager beavers taking notes which must later be studied, memorized, regurgitated. Or he recalls that there was evidence, in earlier exams, that such notes are sometimes transcribed to tiny crib sheets to serve as helps for cheaters. And while these thoughts race through the mind of the bored student—whose family is more interested in his getting a college degree than he—the auditory patterns carry an organization of sound waves that means to others "the causes of World War I." But these meanings never register, nor will they ever be recalled when, as citizen, he votes on issues involving foreign policy. Though he dutifully exposes himself to the daily dosage of audio-visual stimulation, no cumulative understanding is built. Perhaps the raw materials for future mimicry are accumulated; the odds and ends of professorial mannerisms, duly noted or caricatured in marginal doodling, may supply the raw material for later imitative skill.

This last example should remind us that in this organization of the field we are concerned with more than juxtaposition of external stimuli, and with more than sense organs and a cortex. The organizing and grasping is done by a forward-looking, accepting-rejecting, action system, by a motivated person with interests, needs, and purposes.

Embeddedness and the Imprinting Process

Köhler calls our attention to the role of configurational factors in the imprinting process, using Figure 108 as a means of illustrating the point. The numeral 4, which is present in the interspace between the two well-bounded masses, is lost to the perceiver. Its parts belong to the seen figures. If such a symbol were to be used in a conditioning procedure, we would scarcely expect much transfer to a test trial in which the 4 appeared alone. Although in the training series the 4 had been geographically present it

FIGURE 109. Figures of the sort used by Schafer and Murphy in demonstrating the effect of reinforcement upon the configuration process [Based on Murphy, *Personality* (Harper & Brothers, 1947), p 371.]



would not have been reacted to, perceived. What the subject does not see will not enter into his associations, nor will it be recalled, later.

An experimental study by Schafer and Murphy applied the principle of reinforcement to the configuration-forming problem.⁸ Subjects were shown two types of figures. The figures were formed in the manner indicated in Figure 109. With one group of subjects the left-hand face was shown and a small amount of money was given as a reinforcement, or reward. The exposure of the right-hand figure was the occasion for taking back an equivalent amount. With a second group of subjects the reinforcements and "frustrations" were reversed. In the test series the double figures were shown. Results indicated that the "unrewarding" configuration was ignored.*

A Hierarchy of Forms

As soon as the factors we call subjective (set, past experience, physiological state) are brought into the analysis of configuration-formation, we are forced to look upon all learning materials as highly plastic, as capable of being organized into infinitely varied forms. There is a hierarchy of meanings in every situation.

Consider the reading of a poem. Is the poem to be considered merely as a concatenation of syllables, a series of rhythmically accentuated breath pulses, a recurrent and rhyming pattern of sounds? Is it best understood and grasped when we analyze the process down to the contractions of diaphragm and intercostal muscles, recording pitch and intensity of utterance on a sound film while the electrical potentials produced by contracting muscles are photographed on the oscillograph? Or do we get at the heart of the matter when we discover the dictionary definitions of the words, the correct usages which the author's contemporaries understood, the sources in our literary

* In this case we might note that the reinforcement had no important or intrinsic relationship to the configuration. That is to say, there was nothing "monetary" about one profile that made the reward fitting, or intrinsically appropriate. This kind of meaningless loading of a configuration by the pure chance juxtaposition of events represents the senseless sort of learning that some versions, at least, of the Gestalt theory are inclined to neglect or deny, as though it were an almost obscene fact. Perhaps our rational powers ought not to be corrupted by such mechanically operating influences, but the evidence seems to indicate that they are.

tradition from which the author drew his images? Or should we, following the poet's advice, try to

. . . build up greatest things
From least suggestions . . .

opening our thoughts to the widest range of overtones, to ideas and feelings which range far beyond the bare schematic outline of content, far beyond the scholar's definitions, the matter-of-fact usages of the words?

To do less than this last, in which the sense of musical delight is mingled with an imagination tuned to catch the sense of the whole, is to

. . . substitute a universe of death
For that which moves with light and life informed.

Or so, at any rate, the poet himself assured us. Like the Gestaltist, Wordsworth felt that a preoccupation with the parts, the confinement of thought within the bounds of habit, was the prime enemy of poetical understanding. It was

The tendency, too potent in itself,
Of use and custom to bow down the soul
Under a growing weight of vulgar sense,⁹

that brought about this substitution of a "universe of death" for the true, living, world of the imagination.

Shelley's "Ozymandias" can be scanned, taken apart, analyzed for word meanings, metrical pattern. One is prompted to say that the farther the analysis is pursued the more likely is the poem to be lost, even as the flower is destroyed as we pull away petal after petal.

But whether we consider Shelley, the perceiver and composer of "Ozymandias," or the reader and analyst, it is true that the grasping of the most vital meanings is something quite different from merely producing or responding to a series of correctly enunciated and understood words. Not everyone who looks at the fragments on the sand, the shattered visage, the words on the pedestal, can or will make the organization and the reconstruction of the past; and only Shelley could pack into the few lines such a complete sense of the oblivion that awaits present fame

Nothing beside remains. Round the decay
Of that colossal wreck, boundless and bare
The lone and level sands stretch far away.

Summary: The Factors Controlling the Configuration-Forming Process

On the assumption that a cause is "whatever makes a difference" let us try to gather together into one place a set of conditions that ought to be borne in mind when seeking an answer to the question, "What determines the kind of configuration that is formed?"

1. *Intelligence* Considered as sheer capacity, the native endowment of the individual puts limits upon the types of configuration formed. Whatever impairs the functioning of the organism (brain injuries, the schizophrenic deterioration, senility) tends to reduce the configurations to the simple figures, the old and the familiar, the concrete example. "A fool" said Blake, "sees not the same tree that a wise man sees." Stable and stubborn are the forms of the man of plodding intelligence, and that, in part, lends to his behavior a certain dependability that is lacking in the more mercurial intellectual. The latter sees the world as so full of a number of things, as capable of being subsumed under so many categories, that decisions are often difficult. Even moral decisions! While the clever vacillate with their "on the one hand . . . on the other hand," the less clever carry on the world's work.

2. *Experience* And of almost equal rank in the hierarchy of determiners is that set of past determinations which the Gestaltists are so prone to minimize. It is not an accident that the Moscow school boy says, "I want to be like Stalin!" And every cultural matrix will supply the forms in which life is seen. If the matrix is rich enough, if no iron curtain excludes the rich storehouse of our total heritage—limiting what is imparted to that which is immediately useful to some local nucleus of power on the make—then the very multiplicity of forms frees the mind from the dominance of any one. The parochial mind is suggestible, narrow, prejudiced. It sees the inhabitants of other lands as "funny," as "unnatural." Only its own forms are "truly human."

3. *The state of vigilance* When our faculties are functioning at their best we can unite into one figure the most complex and diverse elements. We "make sense" of what we see and read. Things "fit together." At its simplest level, the explanation of the differences in psychological tension are found in physical factors, in bodily health and freedom from fatigue. But a high level of psychological tension demands a degree of inner peace, of freedom from pressing conflicts which rob us of half of our powers, since so much of our energy is devoted to holding whole systems of traces in bondage. What we have willfully forgotten requires some of our psychological force to keep it jailed. And a high level of psychological tension demands a degree of de-

tachment from a too-pressing present, a degree of security and confidence. Both internal need and the external field can press so insistently that our configuration-forming powers are restricted.

When we are fatigued, depressed, when our energies and our confidence are at low ebb, we retreat from the task of organizing, we take refuge in simpler, older forms. We choose the black-white contrast of the melodrama, or we escape in stories of mystery or exciting adventure, or we lose ourselves in the routine form of busy-work which fairly runs itself. At such times we fail to catch the penumbra of meaning, the overtone, nor are we fit to undertake the work of invention and planning for the future. Common sense tells us that it is better to drop it all for a while, and to sleep on it, if the task is serious or difficult.

4. *Direction, goal, objective set* "Politics", we say, "makes strange bed-fellows." And new purposes, new directions, will pull together into one configuration the forms which we once considered entirely separate. There are, in fact, no two objects which are not alike, which do not belong together, which are not similar, *for some purposes*. Some have seemed to deny this.

"Surely it is evident that there are meanings which no operant power, however great, will fuse together in a sane mind, as evident as the fact that no biologic pressure, however great, will make a whelk grow wings. Some meanings, thanks to their structure under the conditions we summarize as 'poetic contemplation', will grow together; others will not, under any conditions compatible with sanity"*

Such a generalization invites contrary inventions! One thinks of "cabbages and kings" (and both are heads), of the "ring and the book," and of the whole language of metaphor which unites things most diverse in nature because of some common aspect, some similarity in the moods they invoke. With no more than two brief associative steps it is possible to find a linkage between any two concepts the dictionary offers; and when we add all those chance combinations of events that go to make up an individual's experience, and the just-experienced past which comprises the objective set, it is certainly doubtful if the imaginative use of such a conception as "whelk's wings" should be used for a test of sanity.

When the motivational tensions rise to a certain level of intensity they sometimes override those external forces (and the forces of use and wont) that normally control the shape of the perceptual field. The incongruent item that would otherwise prevent the formation of the desired shape is

* I. A. Richards, *Coleridge on Imagination* (Harcourt, Brace & Company, Inc., 1935), pp. 33-34. Used by permission.

either warped or neglected. At the white heat of intense emotion the most diverse things become fused. It is true that, unless balanced by an equally strong sense of reality, these wishes and emotions threaten what we call sanity, rationality; and we can be swept into foolish actions, or we wallow in sentimentality, mired in our own projections. What Janet called a high level of psychological tension involves a balancing of a strong sense of reality with a high level of motivation. When the balance is swung to the one extreme we are imprisoned under the "weight of vulgar sense"; at the other extreme the creations of wishful imagination become silly, utterly private, worthless doodles.*

Included in our consideration of objective set should be the level of abstraction at which the perceiver is working. At some level of abstraction, the most diverse things become one. The level of our approach will determine how things are fitted together.

5 *The stimulating field* This is the aspect of the configuration-forming problem that the Gestaltists have concerned themselves with. Before we could understand the effects of the configurational factor we found that we had to trace the stimuli through receptors into the central nervous system. What the Gestaltist has referred to as "sensory dynamics" becomes in our analysis an inter-reflex (or inter-habit) fusion. Before these problems are finally solved psychologists will have to make heavy incursions into the fields of physiology and anatomy.

THE STORAGE PERIOD

Those who have approached the memory process with the Gestaltist conceptions have also urged a more dynamic conception of the *traces*. The traces, they urge, have a shape; and although they grow dim with time they possess certain lively properties of their own, certain internal forces. And they occupy positions within a field (even as presently seen objects create an arrangement of tensions within our action-systems). They rub elbows with those neighbors that crowd them too closely; and in a mutually shared "psychological space" they modify each other's shapes, intruding upon their neighbors when the weak boundaries of the latter afford too little resistance, moving over to join their similars as forces of attraction operate.

* Emotionally involved in the fate of her characters and in the destiny of the culture she was endeavoring to portray, Ellen Glasgow writes, "My chief apprehension was that I might offend against the law of probability, which is the law of nature in all imaginary universes." She saw the people of the South living in a sentimentalized and romanticized view of life and feared her own involvement in the same tradition. What she tried to apply as a remedy in her own writing—a mixture of *blood and irony*—she tried to give to her generation.¹⁰

The trace, in short, is no longer conceived of as a kind of metallic replica of experience, filed away in some rigidly walled safety-deposit compartment of the mind. It is not a local change in brain structure occurring in some identifiable group of cortical cells, or in some dendrite-axon bond joining such cells. Instead, it is conceived of as a much more fluid and lively thing—a ripple, an electrochemical field, a pulsating and often changing system of tensions. When we speak of the *life* of the traces, it is more than a metaphor; we refer to that which underlies very precise and measurable changes in behavior.*

Retroactive Inhibition

Nearness and similarity are important factors in the memory field even as they are in the perceptual field. Frequently discussed under the term *retroactive inhibition*, these facts have long been known to experimental psychology. In the early work with nonsense syllables Müller and Pilzecker found that a second list learned soon after a first had been mastered caused a measureable lowering of efficiency in the later recall of the first list.¹¹ This loss was attributed to the second list's interference with a perseveration process, a process conceived of as a continuing reverberation within the nervous system which had been set up by the learning of the first list. Such a reverberation would have an effect similar to a continued repetition of the list and would therefore increase the strength of the bonds. Although the interpolated tasks were first viewed as a diffuse disturbing factor, it was soon demonstrated that the *kind* of interpolated task was very important. If a subject memorizes nonsense syllable lists, then other lists of nonsense syllables produce the greatest amount of retroactive inhibition; studying geometrical designs or memorizing lists of three-place numbers has less influence; and listening to music, or daydreaming, still less. Recently it has been shown that the *organization* of the learned materials (both the learned and the interpolated) has a pronounced effect upon the amount of interference.

* A *trace* is a scientific construct. No one ever saw a trace any more than a physicist has seen sub-atomic structures. We do not even know where they are located (save that, by definition, they are placed *in* an organism). A trace might be described as that which makes possible the revival of responses made long ago, as that which is preserved when the response to a configuration of stimuli has ceased. In conformity with an ancient and honorable tradition psychological folk-lore places these traces in the nervous system. Some have even suggested a more specific locus, placing them at the synaptic junctions where the transmitting end of one nerve cell (end-brush) joins the receiving end (dendrite) of the next cell. But no one ever saw a trace save as it was expressed in an *act* of recall.

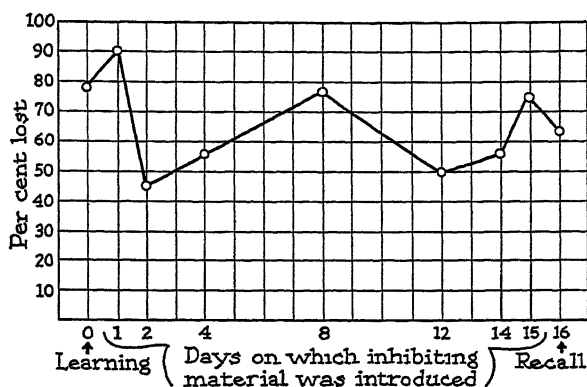


FIGURE 110 Inhibition caused by interpolated material introduced at various times between learning and recall [From Postman and Alper, p 444.¹³]

Proactive and Reproductive Inhibition

In a recent experiment employing lists of short, meaningful words, Werner was able to demonstrate that if the A-list of words is "well-bounded" (that is, organized meaningfully) its elements will not escape from the boundary and intrude themselves upon a B-list that is memorized subsequently. In this case the inhibition would be called *proactive*, the traces of earlier learnings interfering with later organizations. The loose aggregate (bird—pain—free—foot—belt—gray—dear—tick—line—nail) lost some of its members to a second aggregate, and the reproductions of the B-list were contaminated by these intrusions (82 to 218 per cent). When the words of the A-list were joined meaningfully (with—stick—made—from—wood—girl—runs—fast—over—the—ice) the B-list was rarely invaded (05 to 08 per cent).¹² In this instance the *parts* that are adjacent in the memory field are similar in each case, but the amount of interference is determined by the way in which the parts are bound together in a figure. This study, as well as earlier studies on retroactive inhibition, also showed that materials that were well-learned (more repetitions, more complete mastery) were less subject to interference from adjacent traces.¹³

In addition to the proactive and retroactive types of inhibition a third type has been discussed. *Reproductive* inhibition is caused by the placing of the interpolated material just before the recall test, and the amount of interference increases as the position of the interpolated material approaches the moment of recall. Postman and Alper present data that show both types of

inhibition at work; and certain additional features are discussed (see Figure 110). For example, it would appear that the maximum amounts of inhibition do not occur when the interpolated material is placed *immediately* after the first learning, nor when it is placed *immediately* prior to recall. Twenty-four hours after the first learning and twenty-four hours prior to recall prove to be more vulnerable points with the materials (word-lists) used. There is also an upward deflection in the curve at the eighth day which is not easily accounted for. It will be scarcely profitable to review at this place all the speculative constructs that have been advanced to cover these facts. Too many variables remain to be isolated before we can feel certain that we understand the full nature of the process.

These configurational factors we have been discussing also operate within any single system of traces so that the life (or stability) of any part of the system is found to be a function of relationships between that part and the system as a whole. *The different one*, which stands out perceptually and strikes the eye, will form a more stable trace. It will be recalled more frequently and it will be less apt to be contaminated by or fused with the adjacent members of the series. The aggregate formed by the rest of the undifferentiated series will fade more rapidly, will be subject to distortions and displacements; and it will lose members to other adjacent and indifferently structured aggregates¹⁴ (A series such as lat-92-dop-zum-tef . . . or 74-rin-57-38-91 . . . would illustrate what is meant by "the different one" which stands out.)

The Liveliness of the Traces

This conception of the life of the traces makes their existence far from a static one. The waters within the well of memory churn ceaselessly. The restless particles must combine and recombine; and the breezes that send the surface into a pattern of ripples cause an uneasy shifting in the traces, particularly in those that are mere aggregates. The unattached bits of experience which have been organized into no memorable forms are either drawn into the orbits of their better organized neighbors or drop out of the system altogether. As a result of this ceaseless motion within memory's well the materials that are fished up (or bob up spontaneously) are organized into new combinations; and they pass, therefore, for the spontaneous play of the imagination. Their novel linkage with the stimulus that evokes them strikes even the person who carries these processes as something *he* is not responsible for. Indeed the "connection" has been formed in that subterranean limbo outside the boundary of his attentive consciousness.

One of the entries in Coleridge's notebook, that hodgepodge of curiosa which grew as he read the tales of the great voyagers, affords an amusing

illustration of the way in which the parts of stored materials can be transposed, as well as an instance of the power of current interests to elevate memories into new contexts. The notebook's organization shows the way in which Coleridge was stocking his well of memory. Into it he was jotting descriptions of hoar frost, candlelight, a recipe for Irish stew, a note on his young son's fit of crying—a seemingly most heterogeneous collection of shapes calculated to give intellectual indigestion. And appearing in the midst of these jottings was this curious note: "A dunghill at a distance sometimes smells like musk, and a dead dog like elder-flowers." Some time later this morsel returned, rearranged, with musk and elder flowers transposed, and the whole placed in a new context. He wrote, in *Omniana*,

"We here in England received a very high character of Lord——during his stay abroad."

'Not unlikely, sir,' replied the traveller: 'a dead dog at a distance is said to smell like musk.'"*

Forgetting during Sleep

Several experimental studies have compared the rate of forgetting during sleep with the rate during a waking period of equal length.¹⁵ A typical procedure requires subjects to learn a list of nonsense syllables to a criterion (for example, one correct repetition) just before their normal time of retiring. Then after an hour some of the subjects are wakened and asked to reproduce or relearn the original list, others are wakened after two, four, eight hours of sleep. The amount retained can be measured either by the number of syllables repeated correctly without prompting or by the per cent (trials) saved in relearning the series to the criterion. Control subjects learn identical materials and are tested after similar periods of everyday waking activities. The experimental results agree in demonstrating less forgetting during sleep. They also agree in showing the greatest differences in the longer intervals. Once the first hour or two of sleep have passed there does not appear to be a further loss in ability to recall with the greater lapse of time, whereas, in waking, the deterioration in recall continues.

These results have been interpreted as indicating that it is the interpolated activity that interferes with the traces and not some inevitable fading-out

* J. L. Lowes, *The Road to Xanadu* (Houghton Mifflin Company, 1927), p. 10. The musk, apparently, was not well anchored to the dunghill! A pervasive odor, it transferred its attachment to "dead dogs," whereupon it seems to have linked itself with other similars, perhaps with "gay dogs," or "curs." At any rate it has travelled, by way of the bridges supplied by metaphors, to a new human context. Perhaps the real transposition is that which replaces dunghill with Lord——, a substitution that may have been caused by Coleridge's contempt and hostility.

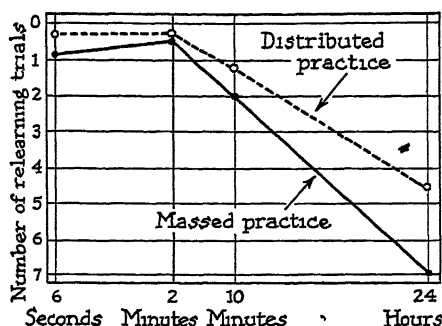
process. The traces are thought of as stamped out by the subsequent traffic, either because new bonds or new configurations are formed with the subsequently imprinted materials (and these attachments and intrusions would interfere with subsequent recall) or because the perseverating traces are broken up, disarranged, or otherwise prevented from setting, by the new, interpolated activity. The diminution of activity and the reduction of external stimulation involved in going to sleep mean that less of this interference will be present. Because the first hour or two of the sleep period includes the period of falling asleep, a period of partial wakefulness and of some restlessness (muscular activity, postural shifts, and conscious preoccupations) this period is the one in which there is the forgetting.

The student who reads these experimental findings might hastily conclude that late evening study is most efficient. Such a conclusion would be premature for two reasons: (1) The efficiency of output per unit of working time declines, for most of us, as the day wears on. Consequently, more trials are required to raise the memory materials to the same criterion of recall. If reading rates and comprehension lag with the onset of fatigue, late evening hours are scarcely the optimal period for learning. (2) It should be remembered, also, that the experimenters have commonly used nonsense syllables, and have carried the learning only up to the point of one or two correct repetitions. The barely learned and the poorly structured traces are the most unstable of all memory materials, and hence calculated to show the greatest amount of interference. An experiment by Newman showed that the central plot of a story, well retained after 8 hours of sleep, was equally well retained after 8 hours of waking activities (87 per cent vs. 86 per cent). Non-essential details, poorly integrated with the story's structure, were less apt to be retained over a waking period (23 per cent vs. 47 per cent).¹⁵ If we think of the stream of neuromuscular activities passing through the waking organism as an eroding influence working upon the stored traces of former activities, we can again see that there are erosion-resisting shapes, that the poorly integrated aggregates, like loose alluvial soil, are easily carried away. Good organization is the cement that binds experiences against the forces that disintegrate and deteriorate; and it would appear that in planning work for efficient memory this factor is far more important than when the work is done.

Reminiscence

Another approach to the problem of the life of the traces is suggested by the investigations of the precise form of the forgetting curve. The gross pattern of events, accepted since the pioneer studies of Ebbinghaus, indi-

FIGURE 111. Average number of trials needed to relearn material after various time intervals Massed and distributed practice compared. [From Hovland, p. 576.¹⁷]



cates a rapid decrease in the per cent recalled during the first hour, with progressively smaller losses in each succeeding hour. When the investigation is made more detailed and the changes in recall within the first few *minutes* are measured,¹⁸ an interesting reversal in the direction of the curve appears. In Figure 111 it will be noted that there is a greater saving in the massed practice curve at the two minute interval than at the six second interval. From this point on the per cent saved declines rapidly. It is the improvement in recall in the early portion of the curve that is referred to as *remuniscence*.

How shall we explain the phenomenon? Shall we refer to a setting process which continues after the practice trials have ceased—our already familiar perseveration? Or shall we look upon it as due to the rapid decrease in some inhibitory factor which has developed in the course of the repetitions. If this inhibitory factor were conceived to be like those fatigue-products that accumulate in the course of strenuous exercise and are rapidly dissipated during rest pauses (as homeostatic mechanisms pay off the oxygen debt) the improvement at the two-minute interval could be explained. Under this conception the *performance* of the subject at any given point during the learning would be viewed as the resultant (or algebraic sum) of two opposed forces: (1) the rehearsals and promptings which gradually strengthen the bonds of habit, and (2) the accumulating inhibitory substances, which do not have time to dissipate from trial to trial and hence cumulatively tend to make it more and more likely that the response will fail to appear. Although the accumulating inhibitory substance does not prevent the subject from reaching the criterion, the dissipation of such substance would tend to bring improvement in the strength of the response tendencies even as the forgetting process sets in. Depending upon the relative rates of these two processes it would either delay forgetting or actually reverse the trend, producing improvement in performance.

This conception fits the data here reported; and it is further strengthened by the fact that reminiscence does not appear when learning trials are distributed.¹⁷ When two-minute rest pauses are placed between each of the succeeding trials the inhibitory factor is dissipated as rapidly as it is formed, and its failure to accumulate gives no basis for the increment in performance that we have called reminiscence. It is also interesting to note that the distributed practice required fewer trials, yet at the 24-hour interval the recall of this series is superior to that of the massed practice series.*

The type of inhibitory factor we have been considering is to be contrasted with that which the Gestaltists have been interested in. The latter have also emphasized the inhibitory effects that arise from the crowding of figures during the imprinting process; but instead of substances they have been concerned with boundaries, shapes, configurations. It is not the amount of material or its mere spatio-temporal density, but rather the shape and organization of the materials that determines the course of events in the subsequent life of the traces. These contrasting interpretations are worth considering in connection with another finding reported by Hovland. Figure 112 shows the influence of serial position upon learning and recall. In the original learning, tested ten minutes after practice, the syllables at either end of the series fare best of all. A Gestaltist might see in this fact clear evidence of the importance of freedom from crowding, of clarity of the figures in the more exposed positions. The first syllables are free from proactive inhibition (during learning) and the last syllables are free from retroactive inhibition. The Gestaltist would translate these experimental facts into his theory of mutual interference of dynamic shapes within the cortical field. The facts also lend themselves to an interpretation in terms of specific S-R bonds, which interfere with both imprinting and recall. But the notion of accumulating substances does not seem to fit the facts so well, for these should accumulate around the last members of the series even more than around the middle portion. Yet, however we view the process at work, we must be prepared to account for the additional facts Hovland reports in his measurement of the 24-hour retention (Figure 112-B). At this point the positions at the beginning and end of the series have lost their advantage. One syllable position is as good as another. But by the second relearning trial the relative values of the serial positions (shown in ten-minute recall) have been restored. This shows that the intra-series inhibitions develop very rapidly, creating a definite hierarchy of reaction-potentials (as measured by ease of recall). The actual speed with which these intra-series inhibitions are dissipated cannot

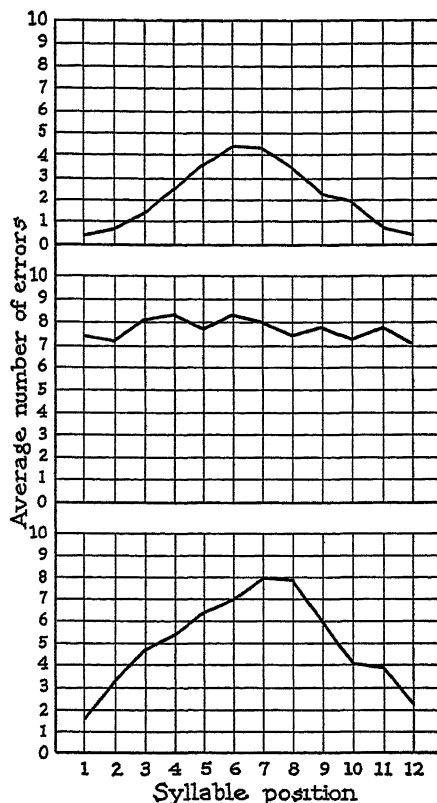
* At one point (two-minute recall) the two series give very nearly identical scores, but with longer intervals of retention the traces formed in the massed practice series are seen to deteriorate more rapidly.

FIGURE 112. Influence of serial position (in a series of syllables) on learning and recall. [From Hovland, p. 577.¹⁷]

A. Average number of errors for each position during recall 10 minutes after learning (massed practice).

B. Average number of errors during first recall trial 24 hours after learning.

C. Average number of errors during second trial of relearning, 24 hours after learning. (This was the first relearning trial following the 24 hour recall trial graphed in B)



be determined from Hovland's published data; but the figures do indicate that they have disappeared by the 24th hour

Instead of looking at the intra-series inhibition as an accumulating chemical substance, or toxin, the inhibition that develops could be conceived of as due to inhibitory CR's, false connections which block correct recall. If, in learning a series of nonsense syllables, the individual syllables are joined not only to their immediate predecessors and successors but to the more remote syllables in the list, these remote bonds would tend to summon wrong responses when a specific response is later called for. Any procedure that would tend to reduce these remote effects would, by implication, reduce those wrong associations. Furthermore, if reminiscence is to be attributed to the dropping out of such intra-serial interference, the reminiscence effect should disappear at the same time. Hovland tested this hypothesis by studying the learning and recall of paired associates when the position of the pairs was altered on each successive trial. Since the bonds with remote syllables are constantly changing under this procedure, while the relations between

the members of the syllable pairs are constant, the intra-serial interference with which we are concerned cannot develop to the degree possible under other procedures. Under this procedure reminiscence did not appear.

It should be remembered, in all this discussion, that we are dealing with nonsense materials, and with short intervals of recall. If we apply our logic to the case of meaningful materials which are retained over longer intervals the phenomenon of reminiscence would become *delayed insight*. The dropping out of irrelevant details, as in Newman's study of the recall of remembered plots (page 548) would alter the configurational forces at the time of recall so that a main outline that had been concealed, overlaid, or inhibited by the excess of materials at earlier stages, could now emerge. Such improvement in organization we often characterize as "getting a perspective." Immersed in the learning experiences themselves, we cannot see the woods for the trees. Dropping them for a while, "putting them to soak" in the well of memory, sometimes enables us to pull up a better organization than we had been aware of at the earlier time when more details were actually at our command. But the experiments of Bartlett, Wulf, Gibson, Carmichael (pages 440-447) to name but a few, should serve to warn us that the changes in configurational forces are affected by many conditions other than the actual relations between the parts we place in storage. The drift in configurations is, alas, toward the probable, the banal, the stereotype, toward familiar "frames of reference"; and sometimes it is toward wished-for (or feared) end-states. Whether these figures are "better" or not, is another matter. Perhaps we should not say "alas, toward the probable"; for what is toward the banal is often toward sanity, toward that main body of wisdom which the culture preserves. The inventor, the creative artist, the innovator, and the observer who would maintain the highest level of accuracy, have cause to curse the trend; for the rest of us, as James would say, it is our "most precious conservative agent." It keeps our thoughts "within the bounds of ordinance."

In some of the experiments on reminiscence the measurements of the successive attempts at recall have been made in the same subject, and have followed the learning of a single set of materials. This means that each effort at recall can be looked upon as a rehearsal; and if the recall of a part of the material serves to consolidate that part, and if each subsequent attempt calls up that part and a few additional fragments, a curve of recall will show the rise that is characteristic of reminiscence. An experiment by Warner Brown analyzed the precise items that appeared in the successive tests and showed that those that appeared in the first rehearsal did tend to remain.¹⁸ A few were lost; but more were added than were lost. Note the tabulation that follows.

Number of items recalled on first test	25.48
Number of items in first recall list	
reappearing in second recall	22.44
New items in second recall	4.33
Total score in second recall test	26.77

The presence of reminiscence would be called into question, here, if one defined it, as McGeoch does, as "the improvement in recall of incompletely learned material after an interval of time *without* intervenient formal learning or *review*"¹⁹

In Brown's data we are dealing with increments added by the rehearsal process itself. It is worth noting that there is an upward swing of the curve. The rehearsal is not mere extinction (as we were inclined to look upon unreinforced repetitions in the case of conditioned responses). As a matter of fact, Pavlov found this phenomenon when he set up the conditioned reflex in the experimental animal by massed repetitions, and Calvin has reported similar findings in measurement of conditioned responses in human subjects. When the CS-UCS pair is presented at 3-3-second intervals, a 24-hour period of no practice brings an increase of 4.95 reactions (7.25 vs 2.3) in a series of ten tests. When the stimuli are presented at 20-second intervals, the increment is from 5.75 to 7.10, a gain of 1.35 points.²⁰

The phenomenon of reminiscence has been found in studies of conditioned reflexes, memorization of nonsense syllables, word-lists, and in studies of the development of motor skills. This increment during an interval free from rehearsal or formal practice reminds one of an older belief that we learn to swim in winter and to skate in summer—a belief that once rested upon an assumed perseverative process, a kind of implicit rehearsal. The studies here reviewed have strengthened an alternate hypothesis—that it is produced by the disappearance of the effects of crowding, interference, and intra-series inhibitions.

McGeoch distinguishes two classes of reminiscence effects. One, intensively studied by Hovland and Ward, occurs within the first few minutes after learning. The second one, typified by the work of Ballard, acts more slowly. Ballard, for example, studied large samples of school children who, after memorizing a poem, were tested for immediate recall. Different groups were given recall tests at longer intervals (1, 2, 3, 4, 5 days, and so on). Using the values for immediate recall as 100, Ballard found that the values for the one-day recall were 111, two-day recall 117, and succeeding days yielded values of 113, 112, 111, 99, 94. That the *increase* over this longer period of delay might be due to an implicit rehearsal process has been sug-

gested; but the fact that white rats also show the phenomenon in their maze learning certainly makes one cautious in thinking about the nature of this implicit process. One experiment in which verbal reports of learners were taken indicated that those who reported no rehearsals showed as much reminiscence as those who admitted the rehearsals ²¹

The theory of differential forgetting, of the more rapid dying out of the weaker intra-serial interference effects, is the theory that seems best established. It is probable that further experimentation will reveal other causes for the phenomenon and that further discriminations will be required within this class of events which we now describe by the single term, reminiscence.

THE RECALL PROCESS

In talking over examination papers with students a teacher frequently meets the student who insists that he *knew* the facts omitted from his answers. The questions, he asserts, were so phrased that they did not tap his knowledge. He had no idea that *that* was the sort of thing that was wanted. Somehow the traces established during his studying were not available. The *shape* imprinted by the question of the examiner simply did not communicate with the proper traces.

In the student's opinion, the fault lay in the phrasing of the question. Just as in Figure 108 the juxtaposition of the visual masses, and the continuity and integrity of the intersecting line, prevent the perceiver from seeing the embedded numeral, the *arrangement* of words and phrases in the question contribute an emphasis, establish a framework of ideas into which recalled items have to fit. The "search among the traces"—if we speak in figurative terms—is for a suitable form: either a similar shape, or a trace that completes an all-but-complete figure. The ripples spreading outward from that portion of the response system into which the questioner's stone was tossed are ripples-with-a-shape; and like the pattern of air waves set in motion by the tuning fork they will set up sympathetic vibrations in a similarly tuned fork. When the questioner asks, "Give a critical appraisal . . .," for example, the word "critical" may set the student searching for negative factors, his own sensitization to criticism being responsible for the self-assigned task which limits the range of his inquiry.

The teacher, in this imaginary conference, may meet the implied criticism of the student with comments upon the faulty way in which the latter has gone about the task of organizing his materials. The relevant facts were not recalled, he is told, because of the careless way they were filed away. Either

the student has tried to memorize isolated facts, failing to reflect upon them or to see their interrelatedness, or he has made false interpretations, fallacious groupings, failing to achieve the proper insight at the imprinting stage.

In this illustration we find the emphases that have consistently characterized the field theory of the Gestaltists. Since we have discussed these principles in other places we shall treat them briefly in this connection, pointing out their influence upon contemporary analyses of the relations between the processes of attending, perceiving, remembering.

Embeddedness, Shape, and the Transfer Problem

The significance of the Gestaltist analysis can be seen most clearly by placing beside it a rival theory. According to this rival theory, the probability that any present stimulus aggregate will call up some past organization of responses increases with the number of common elements. If we state the problem in terms of conditioning we can view the original learning situation as composed of a multitude of stimulus-response connections. A child perceiving a lemon for the first time is stimulated by color, odor, taste, weight, texture, shape, and so on. If we conceive of the total object as an aggregate composed of a finite number of discrete stimuli (and the elliptical or ovoid shape as just one of the components in this aggregate), and if we think of their *togetherness* as of the same order as any other synthetically contrived laboratory compounds (in which buzzes, shocks, meat-powder-tastes, and the like, are combined at the will of the investigator) then the tendency to reintegrate and reinstate the familiar behavioral constellation as a totality would depend, other things being equal, upon the number of familiar elements presented at the time of recall. The "other things" would include such factors as the number of repetitions of the original constellation, the relative intensities of the various components at the time of imprinting and of recall, the motivation or sensitization of the subject at the time of the imprinting and of recall.

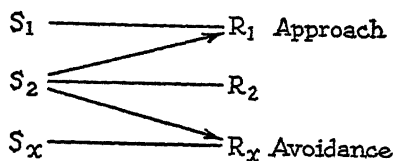
The cross-connections established during the joint action of the aggregate provide the basis for the reintegrative response when just a few of the stimulus elements are presented. The logic of this type of analysis is precisely that of conditioning, discussed earlier, and if we were to substitute for the objective responses those sensations of yellow, sour, heavy (the *experiences* an introspecting subject might report) we should be back with an ancient and honorable kind of psychological analysis which our ancestors most commonly used. The reintegration in conscious recall, so the argument went, was simply a re-assemblage of sensory elements frequently associated; any part can summon the associated whole; the more elements

present "in the field of consciousness" at any given moment, the more likely the redintegration of familiar wholes.

Many experiences tend to support this common-element view of recall. When we persistently search for a name that somehow evades us, we consciously try to make use of every supporting fact (who introduced him to us, who brought him to the meeting, where he lives, who his friends and acquaintances are, what he does for a living, what other occasions had called him to our attention). The parts we succeed in recalling seem to help to bring the succeeding parts in their train until, with enough revived, the name itself emerges. The "guess who" technique of the radio and TV quiz program, in which the recognition of a well-known historical figure is gradually made possible by the addition of more and more biographical material, is another familiar instance of the process. The laboratory studies have also demonstrated what common experience teaches—namely, that recognition is easier than recall. What we cannot reproduce (in answer to a question or in response to a partial cue) we can recognize and identify. We can select the familiar syllables, objects, words, from a mixed list containing new ones, long before we can produce them without the supporting cues. We can select from multiple-choice statements the one that is correct when we cannot produce the statement in answer to the partial cues of a question.

These facts have been the traditional stock-in-trade of association theory, whether it has dealt with conditioned responses in the animal, the recall of nonsense syllables by the human subject, or the problem of transfer of training in educational theory. Yet there are certain disturbing facts. Recall sometimes fails to function even at those very places where there are many common elements. In the Pavlovian laboratory, where the dog has been successfully conditioned to salivate to the metronome, the experimenter cannot call in his colleague to demonstrate the fact. The entrance of the colleague brings a distracting and interfering constellation of sights, sounds, and—especially—odors! The conditioned response is as effectively inhibited as "Junior's" new skill (when mother wishes to show it off).

Curiously, too—in the light of the hours of effort devoted to it—the four years of secondary school Latin seem to give the entering college freshman little or no advantage in his study of first-year French. Some of the rules of grammar are common, and the roots of the words are Latin; but the roots function in new contexts, usage has changed their meaning, and the slight differences in construction inhibit recall. If he applies his Latin mechanically he will make errors. French is, after all, different. Thus we arrive at the notion of positive and negative transfer effects; and we can see that the *number of common elements* is a very poor basis of prediction.



The *blocking* of recall in the similar situation, with many common elements, is handled by association theory in one of two ways. Observing the stimulus (S_2) in the formula at the top of this page, we may note that when it is placed beside some foreign stimulus (S_x) not originally a part of the training situation, this foreign stimulus may so change the character of S_2 that it fails to evoke R_1 . Just as a background of blue would intensify, by contrast, the light lemon yellow of our fruit (in the example of the S-R interpretation of perceiving, page 309) the S_x can conceivably alter the stimulus-value of S_2 so that, in effect, it is moved out along the generalization continuum to the point where the CR fails. We are forced to conclude either that the "element" S_2 has been so radically altered in character that generalization fails completely, or that S_x is a prepotent stimulus that arouses some response or state antagonistic to R_1 . Or—and this is what the Gestaltists urge—we shall have to look upon responses as produced by *configurations* of stimuli. Just as the chemist does not expect the drop of water to ignite with explosive force when it is held in the flame merely because it contains hydrogen-in-combination-with-oxygen, so the student of conditioning should not expect a configuration of stimuli to have the same reaction-invoking-properties that one of the "elements" possesses.

The first alternative reminds us that the word *stimulus* has more than one meaning. As *physical* stimuli the wave lengths and intensities and areas of light sources may indeed be the same in the learning and recall situations. As *physiological* events in the retina, marked changes may be introduced by the simultaneous stimulation of adjacent areas, the chemical changes in the rods and cones may affect adjacent receptor endings, and the neural network in the retinal layer may provide trans-retinal stimulation. We could speak, therefore, of *sensory interaction*. Again, in the neural network of the cerebral cortex, there is abundant opportunity for interaction, and this field of neural-interaction is precisely the physiological event that the Gestaltist picks out as the precursor of our responses, as the physiological event underlying our awareness of the object. And it is at this point that the Gestalt formula would urge upon our consideration the rule that *seen shapes are wholes that are more and other than a mere aggregate or sum of the elements present*.

The second alternative invites us to consider the response (R_x) to the additional element in the stimulus-field (S_x), and to focus upon the relationship between R_1 and R_x . A case in point would be offered by the salivating (R_1) to food (S_1) which is inhibited when a noxious stimulus (S_x) of sufficient strength accompanies the food. The noxious stimulus will arouse the sympathetic branch of the autonomic nervous system. The food, which would otherwise produce a copious flow of saliva, is of little interest, the subject's prepotent motivation is to escape the injurious and painful state of affairs.

Another instance of interfering responses is offered by Leeper's experiment (page 449) in which the "old woman" figure (S_x) forces the ambiguous profile of the woman into a congruent response. Although the profile of a young woman is a type of perceptual response equally within the capacities of the subjects (and can be forced if an exaggerated "young woman" figure is juxtaposed to the ambiguous figure) the response set up by the S_x effectively blocks the emergence of more than the one percept.

Of the three possible ways of conceiving the problem of failure in recall, responsible for the failure of learning to transfer, (sensory interaction, interference between antagonistic S-R units, and embeddedness in an interfering perceptual field) the Gestaltist analysis has consistently stressed the third possibility. Instead of looking upon shape as one element among an aggregate, the Gestaltist conceives of it as the field itself, as a figure-ground relationship, as a fused whole with dynamic properties. Instead of looking upon the parts of the field as elements, each element existing as a kind of sensory atom in a mosaic, the Gestaltist is prone to consider the parts as having no psychological existence apart from the functioning whole. What we are prone to consider as elements are really aspects of the whole, relationships; and though we abstract these elements, point them out, speak of them, they (unlike the grin of the Cheshire Cat) have no more of an independent existence, psychologically, than the sweetness of the lump of sugar, the grace of the dancer. The elements are thus conceived as embedded within and functioning throughout the wholes of which they are aspects. When we act upon the contrary thesis and try to produce a "synthetic lemonality" out of a dash of acid, a splash of yellow, an ovoid shape—without proper regard for the interrelationships—we fail to produce the proper reintegration. The one small change in the recipe can produce a cake that is quite unrecognizable. So a person may possess many of the elements of leadership; but one fatal flaw can throw all the traits into an unfortunate interrelationship. Or, to change the illustration, a person may possess the ele-

ments of musical talent (a sense of pitch, a sense of rhythm, and so on) and yet utilize them in tap-dancing or organ-tuning

The Gestaltist, like a critic with a keen sense of form and style, directs his attention to these over-all aspects of any stimulus configuration. The shape of things becomes *the* dynamic factor in his analysis. Before there is recall, there will be the organizing, shaping, perceiving process in the present. Thus, in his analysis of the act of recall he begins in the dynamically conceived "here and now." If perceiving and recall are to be somehow related, his impulse is to give the shape-giving act-of-perceiving priority. If, in the acts of perceiving and recalling, we are continually adding meaning (from our past) to what is given here and now, the Gestaltist would stress the fact that before anything can be added, before anything is summoned from the depths of the well of memory, there is a *shape* upon the surface of the waters.

The principle of embeddedness can operate at either end of the recall process—that is, at the moment of imprinting or at the moment of recall. If the student in our illustration (page 554) is so familiar with his professor and the latter's ways as to be able to outguess him, in his very study he will be anticipating the type of question the professor will ask. In thus anticipating the recall situation he will make the precise sort of organization that will be most easily available when the question is asked at the examination period. The organization of the trace and the organization of the exam question will be *in resonance*. But if the student has guessed wrongly, then the very organization that gives the traces their stability makes the desired fact unavailable. Kohler's chimp could not utilize the branch of a bush as a stick because it was bound within the familiar and coherent visual bush-configuration. The stick was not there *as such*. It was present as a physical stimulus, but—perceptually speaking—it was not present: it was not isolated, visually, and could not, therefore, cue the grasp-the-stick-by-one-end-and-place-the-other-end-behind-the-banana response.

Thus we can conceive of two cases of failure in recall. In one the fact or skill is familiar and often used. Its organization is perfectly intact. But the question is at fault. The cue is there, the common elements are present; but they are concealed, buried in the wrong perceptual organization. The present field, as a problem, may actually call for the use of the familiar fact or skill; but the evocative shape is not within the perceiver's "seen field." Hence, from the standpoint of the recall that we would like to see occur, the present field of the perceiver is simply improperly organized, mis-diagnosed.

In the second case the present field may be properly diagnosed and the kind of memory needed may be clearly enough defined. But like Koko's

overlooking of the castor bush the perceiver overlooks those memories that were structured for other purposes and organized into patterns that do not fit in with the present definition of the situation

As an illustration of the first case we might take the instance of the young interne who knows precisely what to do in a case of tuberculosis. When, however, the patient sitting opposite him presents an outward appearance quite different from the typical clinical syndrome seen in training, or when—misled by some cue that points in another direction, his effort is confined to the task of finding proofs for what is not there—his knowledge of tuberculosis simply does not transfer. The common elements are present if he can but find them; but they are bound within a different organization from the one where he has hitherto met them, and they are concealed by “screen perceptions.”

An illustration of the second case is offered by an experiment by Harrower.²² In her experiment she gave her subjects the task of completing some incomplete jokes. For example, the subject was asked to complete the following: “A young lady called on Rubenstein, the pianist, who condescended to listen to her playing ‘What do you think I should do now?’ she inquired when she had finished. Rubenstein replied: ‘_____.’”

Where the subjects were unable to complete the jokes they were given two sorts of reading materials, which contained the precise phrases that would complete the jokes. In one group of subjects (16) the material was connected, meaningful, prose. The “answers,” though present, were well-embedded in the context. For a second group of subjects (16) the “answers” were placed within meaningful but disconnected sentences. The “helps” provided by the disconnected materials facilitated completions in sixteen cases, whereas the connected prose helped in but a single case. Koffka, in making use of this illustration, observes: “A trace strongly ‘embedded’ in a trace system is less available for a new process than a trace loosely embedded.”²³ We shall meet these principles once more when we return to the consideration of the reasoning process.

CHANGES IN THE ONE WHO RECALLS

In his discussions of perceiving and recall, the Gestaltist frequently keeps the perceiving person in the background. The figure-forming process is apt to be treated as though it were a matter of sensory interaction, of cortical fields formed by electro-chemical changes which distribute themselves over the brain surface in as mechanical a fashion as that in which charges dis-

tribute themselves over a conductor. Although this dynamic togetherness occurs within a perceiver, the latter serves more as a passive container than as an active participant in the process.

Yet he is in the field. Sitting in the railroad coach, with platform vibrating from the rolling wheels as the trains pull in and out of the station, the same ocular movements, the same retinal stimulations, give rise to contradictory perceptions. This time *he* is moving, he feels, and the organization of the perceptual field is all related to this basic motion. And the so-called basic motion can be illusory, depending upon his motivations, tensions, expectancies, sets, and the field of stimulation from which he has just emerged.

Thus the self-system, that larger organization or schema which more or less continuously binds the waking person to the larger field within which he is oriented, is always a dynamic background and component in this configuring process. The stimulus, if by stimulus we mean any local change occurring within this total system, enters an organized system and is incorporated within an already structured field. It enters, for example, from some quarter. It is not merely a stimulus, but a stimulus entering *there*. And that particular spot which we label *there* is already playing a role, filling a function in the larger schema, the self-system. Entering at this particular place the stimulus is already subject to determining and qualifying properties, if only those of remoteness. And if it is along the roadway leading from Nazareth that we spot the moving speck, then the stimulus enters with the "Can-anything-good-come-out-of-Nazareth?" expectation surrounding it. The perceiving system is a person-in-action, a person dynamically geared into a surrounding matrix. Like a spider sitting at the center of his web, waiting the cues that will announce that another fly is caught *over there*, the self is integrated with a field. This self-schema is operating even as we set our feet on the floor in the morning; and some of it we do not relinquish even in the relaxation of sleep. Witness, for example, the mother's start at the faint cry of her ailing child; or consider the troubled dreams that continue, however fantastically, the unfinished tasks of the day.

The Changing Self

It is common to think of the self as though it were a thoroughly consistent and unchanging thing. We possess the same name, receive all the mail addressed to this name, enter into contracts and, years later, complete the payments; and in the statistics of populations the same integer continues to represent us. And John Doe has the illusion that there is a John-Doe-self that is the same yesterday, today, and tomorrow. But we have reason to believe that this is not, strictly speaking, the true state of affairs. The very foun-

dations of the self in a biological organism are changing, maturing, ageing, now tired, now tense and expectant, now gaily relaxed. And the accumulating mass of conditioned expectancies, the compounding web of our experiences, is a changing thing. The contexts to which the self is bound also change, and in changing also change the self. Standing with my friends and allies my strength participates in their strength, our strength is mine.

On the other hand, read out of the party, rejected by his friends, the self loses strength with the loss of this sense of one-ness. "The day I left the Communist Party," wrote Silone, "was a very sad one for me, it was like a day of deep mourning, the mourning for my lost youth."²⁴

Amnesia and the changing self According to one writer, the cumulative changes in the structure of the self and its field, which come with our growth and development, lie at the basis of that amnesia that overtakes us all, preventing us from recapturing the experiences of our earliest years. In those early months before vocabulary has developed to provide conventional handles for every object, clichés for every situation, and before those needs and purposes of an adult civilized being have taken shape, experience has a structure, to be sure, but it is a structure so utterly different, so foreign to the categories of adulthood that we can no longer imagine or recapture it. Then ego and alter, self and its objects, were not completely differentiated.²⁵ The spatial-temporal organization has not yet developed, and there was no autobiographic memory, for there was no clearly defined "I" with a past and with hopes reaching into a future. We might imagine such an undifferentiated ego—like a lazy swimmer on a summer afternoon—feeling at one with all around him, sensing only an eternal here and now. Their very lack of shape and anchorage makes such infantile experiences unrecallable.

Adult categories and adult purposes develop, providing frameworks within which experience is stowed away, but these very frameworks provide no shapes that fit infantile experience. They neither summon nor hold such experiences. The shape of things perceived by the adult person-in-action strikes no resonant similar shape in this early period.

Unconscious memories And so, argues Schachtel, it is with dreams. With our return to waking concerns we lose those fantastic shapes that developed while we had loosened our hold upon practical concerns. It is not so much that we repress them as it is that we have little use for them and only partial access to them. Unless we make haste to jot them down while they are still reverberating within the field of awareness, we lose them; and in the very act of transcribing them we have the vague sense of

distorting them toward the conventional. The shift in attitude splits away those shapes that fit in so poorly with our culture-bound, logical, rational, waking categories. Like Maslow's Indian melodies (page 346) their very distortion, their very foreignness, makes them difficult to grasp and hold.

But if the growth of the self and the progressive individuation of our experience into the sharply defined forms of adulthood forever shut out from our recall that inner world of childhood, and if they prevent us from recapturing the wonderful freshness of all the "looks" and "feels" and "smells" of infancy, there is reason to believe that these early events are not wholly lost. Their traces are there, as surely as those traces of infantile illness reveal themselves to the X-ray of bone structure (page 113). They escape our conscious efforts at recall, it is true; indeed, we could scarcely recognize them if they were to appear before us, so diffuse, undifferentiated, mixed-up, as they must be. Yet the facts of conditioning and the evidence of psychopathology both incline us to the view that the events of these earliest years are not without influence throughout our lives. Though we cannot recapture them in our perceptual consciousness, they continue to affect our behavior. They had their influence in the gradual establishment of our life style, and this persists. They helped to establish that early direction to our lives which has issued into the final preoccupations of our mature existence. And they may well be the causes for those unexplained auras of mood, those mixtures of wonder, fear, anxiety, depression, that come from we know not where. It was the positing of such an infantile factor, concealed by a baffling amnesia, that led Freud to develop the concepts of the unconscious and of the process of repression; for he found that though inaccessible to consciousness, the adult pathological motivations seemed to imply some such underlying linkage from the infantile level. He saw, in short, in the odd impulses of the compulsive patient, in the peculiar lapses of the hysterical, evidence of a dynamic layer of causation beneath the surface of adult awareness, as though this forgotten infantile self had somehow returned.

Though we mature as organisms and take on the adult ways of our society, though the self and its field have so altered that infantile ways of perceiving cannot be consciously recalled, there *is* a kind of memory of these events which persists. Schachtel refers to it as "the memory of the body"; but this term seems unfortunate in that it seems to imply another and less material sort of memory. All memories are of the body, as far as natural science knows them. We might, however, conceive of a hierarchy of bodily organizations, with the lower, less differentiated, cruder, non-verbal, pre-cultural, patterns representing the organizations of infancy. At the top level we could conceive of those highly differentiated self-systems, articu-

late, well-verbalized, containing our present needs and plans. The outer event that impinges upon this hierarchy of organizations sets organized responses going *at all levels*. Though we *talk* as though but one level is involved (the upper, adult, civilized one) all levels respond. There will be some interference, some facilitation, and rather poor communication between the levels. Adult, child, and infant act at once. Only the adult is fully aware, conscious; and only his categories circulate freely among his age peers. But though this level dominates the scene the "lower" orders also function.

This concept of a hierarchy of responses simultaneously active but dominated by an active, conscious, adult ego, helps us to understand that profound difference in the quality of our memories which Proust celebrated in his *Remembrance of Things Past*. There is an experience of the past, so vivid, so exact, so complete in every emotional overtone that it deserves to be called true memory. Typically it evades us when we seek it, and it intrudes when we least expect it. When we are least preoccupied with the active striving of our adult concerns, in a moment of reverie, on a stroll, waiting in an ante-room for an appointment of no particular moment—then a sound, a taste, the pressure of our sole against the boardwalk, an odor, will set one of those lower levels of the hierarchy vibrating and a whole sequence of vivid experience long forgotten passes through our field of awareness. A face we had long tried to recall—with no success—the palpitating feel of a roadside quarrel of two schoolboys (in which we participated). These flashbacks are so vivid that they seem to carry their own validating stamp of certainty. Such memories are a veritable *re-living* of the past. But their rarity, and the fact that they require a detachment from the present, indicates the degree to which our ordinary acts of remembering involve a re-ordering, an abstraction and a selection. This second way of looking backward—the most common type of recall—is under the control of our present purposes. It is affected by our present need to communicate. Hence we call up the verbalizable aspects of the past and talk about shared objects and situations rather than the past as it was for us. Often our recall is full of "as I said" and "then she said"—and sometimes we catch ourselves, in the present, getting ready for future recall by formulating the story we shall tell. At the very time of experiencing we construct for our anticipated audience a fictional, acceptable, account of events—and this account is not always too accurate a translation of experience into words.

Thus our experience, which we fish up, has a certain monotony to it. It conforms so neatly to certain regnant and acceptable categories. It is like everyone's else. In the very process of achieving the vocabulary and the

socialized categories of adulthood, the memories of our earliest childhood become unavailable. And the more socialized we become, the less we are able to reproduce with complete accuracy and frankness the experiences of a highly unique self. The individual idiom gets lost, the cliché is preserved. We, too, recite: "The lion is king of the forest, the rose is queen of the garden." Like Will Rogers, who used to preface his column with "I see by the papers . . .," we remember that which everyone else says he remembers. We recall our first long trousers, our wedding day, and heaven knows what besides, in an "appropriate" fashion. That is, at the conscious level of recall.

That there are at least two, and perhaps many, levels of recall was apparent when, in an earlier chapter, we discussed the problem of emotions. When we turn, finally, to sketch the development of the conscious self we shall have to re-examine this question. Indeed, it penetrates all of our perceiving, thinking, and reasoning.

REFERENCES

- 1 William James, *Psychology, Briefer Course* (Henry Holt & Co., Inc., 1915), p. 16.
- 2 R. W. Sperry, "Cerebral Regulation of Motor Coordination in Monkeys Following Multiple Transection of Sensorimotor Cortex," *Journal of Neurophysiology*, 10 (1947), pp. 275-294.
- 3 H. Kluver and Paul Bucy, "Preliminary Analysis of the Functions of the Temporal Lobes in Monkeys," *Archives of Neurology and Psychiatry*, 42 (1939), pp. 979-1000.
- 4 G. M. Stratton, *Experimental Psychology and Its Bearing upon Culture* (The Macmillan Company, 1903), p. 129.
- 5 M. Wertheimer, "Untersuchungen zur Lehre von der Gestalt. II," *Psychologische Forschung*, 4 (1923), pp. 301-350.
- 6 Wolfgang Kohler, *Dynamics in Psychology* (Liveright Publishing Corporation, 1940), pp. 85 ff.
- 7 G. E. Müller and F. Schumann, "Experimentelle Beiträge zur Untersuchung des Gedächtnisses," *Zeitschrift für Psychologie*, VI, No. 81 (1897), p. 257.
George Katona, *Organizing and Memorizing* (Columbia University Press, 1940).
- 8 R. Schafer and G. Murphy, "The Role of Autism in a Visual Figure-Ground Relationship," *Journal of Experimental Psychology*, 32 (1943), pp. 335-343.
- 9 William Wordsworth, *Prelude Book XIV, Conclusion*.
- 10 Ellen Glasgow, *A Certain Measure* (Harcourt, Brace & Company, Inc., 1938), p. 40.
- 11 G. E. Müller and A. Pilzecker, "Experimentelle Beiträge zur Lehre von Gedächtnis," *Zeitschrift für Psychologie*, Ergbd. 1 (1900), pp. 1-288.
- 12 Heinz Werner, "The Effect of Boundary Strength on Interference and Retention," *American Journal of Psychology*, 60 (1947), pp. 598-607.

- 13 Leo Postman and Thelma G Alper, "Retroactive Inhibition as a Function of the Time of Interpolation of the Inhibitor between Learning and Recall," *American Journal of Psychology*, 59 (1946), pp 439-449
- J. A McGeoch, *The Psychology of Human Learning* (Longmans, Green & Co., Inc, 1942)
- S. H Britt, "Retroactive Inhibition A Review of the Literature," *Psychological Bulletin*, 32 (1935), pp 381-440
- 14 Kohler, *op cit*
15. J. G Jenkins and K. M. Dallenbach, "Oblivescence during Sleeping and Waking," *American Journal of Psychology*, 35 (1924), pp 605-612.
- A. Dahl, "Ueber den Einfluss des Schlafes auf das Wiederer-Kennen," *Psychologische Forschung*, 19 (1928), pp 316-322
- E. B Van Ormer, "Retention after Intervals of Sleep and of Waking," *Archives of Psychology*, 137 (1932), pp 5-49
- E. A Graves, "The Effect of Sleep upon Retention," *Journal of Experimental Psychology*, 19 (1936), pp 316-322.
- E B. Newman, "Forgetting of Meaningful Material during Sleep and Waking," *American Journal of Psychology*, 52 (1939), pp 65-71
- L. B. Ward, "Reminiscence and Rote Learning," *Psychological Monographs*, 49 (1937), No. 220
16. Carl I Hovland, "Experimental Studies in Rote-Learning Theory IV Comparison of Reminiscence in Serial and Paired-Associate Learning," *Journal of Experimental Psychology*, 25 (1939), pp. 466-484.
17. Hovland, "Experimental Studies in Rote-Learning Theory VI Comparison of Retention following Learning to Same Criterion by Massed and Distributed Practice," *Journal of Experimental Psychology*, 26 (1940), pp 568-587.
18. Warner Brown, "To What Extent Is Memory Measured by a Single Recall?" *Journal of Experimental Psychology*, 6 (1923), pp 377-382
- 19 G. O McGeoch, "The Conditions of Reminiscence," *American Journal of Psychology*, 47 (1935), pp 65-89
- 20 Ivan P Pavlov, *Conditioned Reflexes* (Oxford University Press, 1927)
- J S Calvin, "Decremental Factors in Conditioned-Response Learning," Ph D Thesis, Yale University, 1939.
- 21 P B Ballard, "Oblivescence and Reminiscence," *British Journal of Psychology*, Monograph Supplements, 1 (1913), No 2
- Ward, *op cit*
- M E Bunch and W K Magdick, "The retention in Rats of an Incompletely Learned Maze Solution for Short Intervals of Time," *Journal of Comparative Psychology*, 16 (1933), pp 385-409
- McGeoch, *op cit*.
- Hovland, "Experimental Studies in Rote-Learning Theory I Reminiscence following Learning by Massed and by Distributed Practice," *Journal of Experimental Psychology*, 22 (1938), pp 201-224
- , "Experimental Studies in Rote-Learning Theory II Reminiscence with Varying Speeds of Syllable Presentation," *Journal of Experimental Psychology*, 22 (1938), pp 338-353.
- , *op cit*
22. M. R. Harrower, "Organization in Higher Mental Processes," *Psychologische Forschung*, 17 (1932), pp 56-120.
23. Kurt Koffka, *Principles of Gestalt Psychology* (Harcourt, Brace & Co, Inc, 1935), p. 623.
24. Ignazio Silone in Richard Crossman (ed), *The God That Failed* (Harper & Brothers, 1949).
25. Ernest G Schachtel, "On Memory and Childhood Amnesia," *Psychiatry*, 10 (1947), pp 1-26

PART SIX

The Reasoner

CHAPTER 16. Reasoning, Thinking, and
Problem-Solving

CHAPTER 17. Reflections on the Nature
of Everyday Thinking

CHAPTER 16

Reasoning, Thinking, and Problem-Solving

What view of human reasoning can a psychologist hold at this point in the twentieth century? And what prior commitments has he made in setting up his own *science* of behavior? Entering the field once preempted by philosophers, artists, and theologians, and equipped with the logical tools developed by mathematicians and natural scientists, he has seemed to many to be a brash and pretentious youngster, proposing to accomplish with his postulates and his measurements, his experiments and his logic of science, what wise men and sensitive artists had not been able to do. Can he eliminate their differences by discovering coercive facts, facts anyone can verify? The psychologist's optimism implies that he has discovered the one true way to reason about human beings, and that his reasoning will provide the standard against which to measure the reasonings of all others.

And what, precisely, is this process or power we call "Reason?" A century ago the answer seemed clearer, in some respects, than at present. There seemed to be general agreement that Reason was a *faculty* with which man alone, of all living creatures, was endowed. This faculty enabled him to perceive a world that lay beyond the field delimited by our feeble senses, to test the truth of every proposition. Even more important for our collective peace and happiness, Reason was the ruler within the psyche who held in check our wayward impulses, bringing order and consistency, poise and certitude, into what would otherwise be a chaos. And the phrenologists who

still flourished a century ago were even prepared to break up this faculty into a finite number of parts, locating each in its nook in the brain, measuring the strength of the various components by the masses of brain tissue in each nook.

As psychology grew from its swaddling clothes phrenology was discredited; and the very phrase "faculty psychology" became a term of reproach. The cardinal sin—young psychologists were taught, at the opening of the twentieth century—was to observe a *process*, some complex function, and then to *re-ify* it, making the process into a thing, a force, a power, an entity which regulates the process. Thus we learned, as Scientific Nominalists, to say. "There is no such thing as Reason. There are reasonings, events, goings-on, which we *name* Reasoning." The *faculty* of Reasoning had exploded, leaving us with dozens of part-processes, and hundreds of factors or conditions that facilitated or interfered with a type of ongoing process. Gone was the ruler of the mental household. Gone was Right Reason which approved of all true doctrines. Gone was any power that could claim to transcend direct "objective experience." Gone was the certainty that Reason once vouched for.

Today the psychologists look out upon groups of higher anthropoids, each group possessing a more or less closely knit organization (which we call culture), each group possessing a set of beliefs, values, and each group producing a characteristic life style in its members. Where, in all of the chatter and struggle within and between the groups, is there any going-on that we would want to name Reasoning?

The struggle to master the environment? The effort to come to terms with the culture, or to mold the young into conformity with the mores? The process of learning to anticipate the future turn of events, to seek what is needed and to avoid that which is painful? In our studies of motivation, learning, perceiving, we have dealt with these problems, and we have found no need to call in some special faculty or to segregate a special process called Reason.

Either we have overlooked some important area, or function, or our term, Reason, is simply a relic of a pre-scientific age. If it is the latter, if—lacking sufficient observation to state the laws of motion for human behavior—our predecessors tried to order the stream of behavioral events by appealing to a hypothetical faculty, we can well afford to omit all concern about this missing function. Psychology has no more need of a Mr. Reason than the weather bureau has a need for those Friendly Ancestors who, in Zuni belief, push the clouds around.

DELIMITING AN AREA

There is one function we touched upon in our chapters on learning and perceiving that comes very close to the role formerly played by Reason, and it is a function that is more highly developed in man than in any other species. Man has the power to *represent* his world, to build a thought-model, a word-world or symbolic surrogate, a *cognitive map*. There is evidence that animals, too, possess at least the primitive beginnings of this function; but man is a specialist in the task of representing the world as he sees it. He can communicate his view of things to others, preserve his discoveries in libraries and museums, transmit them to oncoming generations. And by manipulating these thought-models under simplified conditions he can discover relations and properties which his more complex and confusing direct experience will not yield. And acting upon his discoveries he can verify them in direct experience.

Man is the only *intentional* model-builder, aware of what he is about and working as specialist at the task of building models that represent—with increasing faithfulness—the world he experiences directly.

Building a Model

Before we need it, and long before we are aware of what is taking place, a verbal-gestural model of the world is established within us. Our first words carry such heavy freight that they are rather poor representations. Like the Balinese mother's "Aroh!"—calculated to frighten her child, arrest whatever he is about, and to send him running to his mother's sheltering arms—they *point out* very little. They are action-words, commands, bludgeons, pushes or pulls, embedded in a behavior-sequence in a field, just a shade above the animal cry.

One of the "just-so" stories that describe the possible ways in which language may have originated has a certain ring of truth; and it illustrates a characteristic of the language of the child and of the primitive. Otto Jespersen invites us to imagine a band of primitive warriors setting out across a river, attacked by enemies, finally victorious, dancing in jubilation and chanting (for no particular reason) some nonsense phrase, even as children in their play will take up a rhythmic chant.¹ Suppose that the phrase shouted by the victorious warriors happened to be "Ta-ra-ra-boom-de-ay." Then, at some later day, if one of the same band of warriors shouted "Ta-ra-ra-boom-de-ay," it might mean to those who had been there something like the following sentence:

"Do you remember the day we met the enemy from across the river and vanquished them?"

But memory being what it is, and the context and anticipatory sets having the influence they do, it could also mean:

"Happy?"

"Look out! Perhaps enemy warriors are hiding in those bushes!"

"Let's form another war party," and so on.

In the same way the child's first "Da"—when it is transformed from reflex vocalization into true speech—can mean:

"Give me the doll."

"That's my doll."

"You take the doll."

"That is a doll, too," and so on.

And again, the family will interpret in the light of the context.

Such compact symbols, loaded with confusing emotional and conative meanings, make poor instruments of communication. In order to carry their precise meanings they require in addition the overtones and emphases of supplementary inflections, gestures, the full vision of the speaker in a context, and the like. And they are poor models for problem-solving.

As language develops in the individual and in the race it grows more precise, more highly structured, and it is extended to cover virtually everything that the participants in a community need to talk about.

Classes and Concepts

The language-model creates *groups* of objects and relations which have a functional similarity in the life of the tribe; and it separates the functionally dissimilar. We need not ask whether the groupings are *natural* or whether the objects that are separated *should* be separated (because they are separate in *reality*, or in the eyes of some recording angel). What the tribe unites, let no tribesman put asunder! Aroh! Nor will it help us to say that it is Reason that makes the categories.

Those who have studied the language of primitive peoples are impressed by the relative paucity of general terms. They may name every species of parrot but have no word for parrot, name every kind of tree and fish but have no class names for either, give totally different names to the red-cow, white-cow, black-cow, but lack the name for cow. What we unite they separate. But it is equally true that they distinguish what we confuse. Australian tribes divide space into totemistic areas, and the Balinese distinguish between the

“west” that points to the center of the island (sacred) and the west that is coastal-ward (profane).

The child, growing up in a culture, acquires these word-models, and the tribal categories, by a process of conditioning. Hull’s description of the way in which a child acquires the meaning of the word *dog* serves to illustrate and emphasize the unintentional and non-logical character of the process.

“A young child finds himself in a certain situation, reacts to it by approach, say, and hears it called ‘dog.’ After an indeterminate intervening period he finds himself in a somewhat different situation, and hears that called ‘dog.’ Later he finds himself in a somewhat different situation still, and hears that called ‘dog’ also. Thus the process continues. The ‘dog’ experiences appear at irregular intervals. The appearances are thus unanticipated. They appear with no obvious label as to their essential nature. This precipitates at each new appearance a more or less acute *problem* as to the proper reaction. This problem largely monopolizes the focus of consciousness. Meantime the intervals between the ‘dog’ experiences are filled with all sorts of other absorbing experiences which are contributing to the formation of other concepts. At length the time arrives when the child has a ‘meaning’ for the word *dog*. Upon examination this meaning is found to be actually a characteristic more or less common to all dogs and not common to cats, dolls, and ‘teddy bears.’ But to the child the process of arriving at this meaning or concept has been largely unconscious. He has never said to himself, ‘Lo! I shall proceed to discover the characteristics common to all dogs but not enjoyed by cats and “teddy bears.”’ The formation of the concept has never been an end deliberately sought for itself. It has always been the means to an end—the supremely absorbing task of physical and social reaction and adjustment. Such in brief is our ‘standard’ or normal type of concept evolution.”*

The Nature of the Concept

What is it that the child *has*, when he has a *meaning*, or *concept*? Shall we be content to say that when he can produce a discriminable and recognizable speech sound whenever the dog appears, or whenever he wants to call attention to the animal, or whenever he uses this speech sound as a means of enlisting aid in getting toward or escaping from the animal, he demonstrates that he has the concept?

Or shall we, knowing the dangers of false generalizations, insist that he

* C. L. Hull, “Quantitative Aspects of the Evolution of Concepts,” *Psychological Monographs*, 28 (1920), No. 123, p. 7. Used by permission of the American Psychological Association, Inc.

must be able to discriminate the boundaries of the class, distinguishing non-dog and near-dog from the true species? Obviously this would provide us with a serious problem in determining the boundaries of the concept of concepts, for the taxonomist himself has his difficulties, here; and we shall have to be content with a quantitative statement of probability. Using a widely ranging sample of dogs, near-dogs, and non-dogs, we might give our young learner a quantitative score on his concept of "dog-ness," indicating that with this measuring device he functions at 93 per cent efficiency

The process of establishing discriminations of this sort moves relatively slowly, at least at first. The see-saw of generalization and extinction proceeds until a *functional concept* roughly uniting those things that should go together and separating those things that should be separate is formed. And the borders within which the naming function works correctly may be quite narrow: the Great Dane is confused with a pony; the woolly kid certainly looks more like a dog. To the sophisticated classifier the learner seems unduly given to metaphors, to imaginative but inaccurate analogies. The primitive tribesman called the missionary's umbrella a bat, and the child called the corkscrew "crooked scissors." But these are simply examples of that generalization so common in the early stages of discriminative conditioning.

On his part, the learner is often troubled by a certain arbitrariness in his mentors. Consider, for example, the predicament of the child in the Southern culture who has to learn caste-ways. Here the borderlines are difficult to learn and the discriminations loaded with powerful reinforcements. Here is a passage by Lillian Smith:

(The Smith family, acting out of compassion, had taken a little "white" child into their home. Discovered in a Negro family, this orphan had to be removed from these surroundings; and the Smith family came to the rescue. When, some time later, the family were informed that the child had Negro blood, the child had to go. This proved difficult for the child, Lillian, to understand.)

"Why? Why is she leaving? She likes us, she hardly knows them. She told me she had been with them only a month."

"Because," Mother said gently, "Janie is a little colored girl."

"But she can't be. She's white!"

"We were mistaken. She is colored."

"But she looks . . ."

"She is colored. Please don't argue!"

"What does it mean?" I whispered

"It means," Mother said slowly, "that she has to live in Colored Town with colored people."

"But why? She lived here three weeks and she doesn't belong to them, she told me she didn't "

"She is a little colored girl "

"But you said yourself that she has nice manners. You said that," I persisted

"Yes, she is a nice child But a colored child cannot live in our home."

"Why?"

"You know, dear! You have always known that white and colored people do not live together."

"Can she come over to play?"

"No."

"I don't understand "

"I don't either," my younger sister quavered.

"You're too young to understand And don't ask me again, ever again, about this!"

Mother's voice was sharp but her face was sad and there was no certainty left there *

Carried to its limits the process of naming and classifying becomes so explicit that the learner can analyze the object, isolate the differential class-marks. He differentiates the species as a taxonomist would, defining the category. But like all taxonomists he will meet borderline cases which are confusing A is both A and B White is colored. Dog is wolf. After he has set up syndromes, clinical pictures, which clearly differentiate between schizophrenia and manic-depressive psychoses, the clinician finds patients who must be described as suffering from a "manic-depressive psychosis with schizophrenic features " The psychoanalyst describes unconscious purposes, the sociologist has his "upper-lowers." Mixed categories, obscure boundaries, and confused naming pursue the human classifier to the end of the chapter. Nature does not obey the categories

The concept itself begins to differentiate itself from these outward signs; but it cannot be observed directly, either by introspection or by objective observation. It is inferred. It is that standard (the sum-total of subjective conditions formed through training) which controls discriminative responses. It is a preparation to deal with a range of objects, a mobilization of a central tendency, a readiness to apply a class name when certain con-

* Lillian Smith, *Killers of the Dream* (W. W Norton & Company, Inc., 1949), pp. 27-28. Used by permission.

figurations of stimuli are present, to anticipate consequences for each one of a range of possible actions. It is that standard which we try to make explicit, communicable, as we verbalize, diagram, schematize its structure, naming the differentiating marks of a class. But there is abundant evidence that having a concept and being able to verbalize it are two different things.

And it must be added that any limited sample of overt behavior can give us but a rough basis for inferring the precise nature of the regulative concept. Certainly the overt behavior is not the concept.

We shall see the significance of these distinctions more clearly as we proceed with an analysis of the experimental data. For the moment let us be content with distinguishing four things:

1. *Words*. names that we give to a range of objects, differentiating signs, diagrams, gestures. These serve to communicate our categorizing to others, to represent the class to ourselves, more or less adequately. We can also include the three-dimensional model, the pilot plant, the experiment designed to represent some other field, and so on.

2. *Thoughts*. the concept itself, the inaccessible anticipatory response, the generalized readiness, partly conscious, never symbolized with *complete* adequacy in any model, proposition.

3. *Things*. the object itself, that which is presented to the observer. In the experimental situation it is the layout of stimuli, the procedure of the experimenter, and the like. *All* of the object does not get into the description, the protocol. We cannot represent the object itself, perfectly; but science has found ways of approximating this function, and of achieving practical results of great value.

4. *Behavior*. the actions of the reasoner, including his speaking, schematizing, verbalizing, but also going beyond (and often contradicting) the categories he names.

EXPERIMENTAL STUDY OF THE EVOLUTION OF CONCEPTS

We can sharpen the precision of our own thought-model of concept formation if we follow the work of experimenters who have tried to construct a miniature field in which the course of forming a concept could be followed, with tests and measures introduced to give quantitative results. On the pages that follow, the studies of Hull, Smoke, and Reed will be examined in some detail.

	Name	Concept	Pack I	Pack II	Pack III	Pack IV	Pack V	Pack VI
Series A	oo	𠂇	𠂇	𠂇	𠂇	𠂇	𠂇	𠂇
Series B	yer	𠂇	𠂇	𠂇	𠂇	𠂇	𠂇	𠂇
Series C	li	𠂇	𠂇	𠂇	𠂇	𠂇	𠂇	𠂇
Series D	ta	𠂇	𠂇	𠂇	𠂇	𠂇	𠂇	𠂇
Series E	deg	𠂇	𠂇	𠂇	𠂇	𠂇	𠂇	𠂇
Series F	ling	𠂇	𠂇	𠂇	𠂇	𠂇	𠂇	𠂇

FIGURE 113. Characters used in Hull's study of concept formation. Shown here are 6 of the 12 Series and 6 of the 12 Packs. The pattern is the same throughout the Packs and Series. Series G to L use other "Concept" characters. Packs VII to XII present further embodiments of the "Concept" figures [From Hull, p. 10² By permission of *Psychological Monographs* and the American Psychological Association, Inc.]

Hull's Study

Starting with the analogy of the child learning the act of naming dogs, Hull prepared a group of unfamiliar Chinese characters (Figure 113), presenting them singly to his subjects by means of an exposure apparatus.² Each character was exposed in the aperture for a period of 5 seconds. A series of 12 characters was called a *pack*. In the middle of the exposure period the name of the character was pronounced (*oo*, *yer*, *li*, *ta*, *deg*, and so on); after the series had been run through once, the subject was then instructed to give the name, whenever possible, before the experimenter's prompting. The series, with promptings, was repeated until the subject could anticipate the name of each character. Twelve packs of characters were used, six while the subject was learning to identify and name the characters, six while his learning was tested. Each pack contained an *oo*, a *yer*, a *li*, and so on. Thus there were twelve *oo*'s, all belonging to the same *family of characters*, and each character in the family possessed a common radical, or root-design. The order followed in successive packs was altered each time (so that the subject could not learn that an *oo* always occupied the first position, a *yer* the second, a *li* the third). There was nothing to

prevent the separate packs from being learned in terms of syllable position (and hence without actual inspection of the visual pattern) but this type of learning would mean that nothing transferable from pack to pack was being acquired

When the test packs (VII to XII) were exposed, each pack was run through three times without promptings. The subject was encouraged to guess. For each name and category, therefore, there were 18 test exposures, and for each subject there was a total of 216 test-measures of the 12 concepts.

The exposure of each pack, during learning, was continued until all 12 characters could be correctly named without prompting. By recording the number of promptings required on the first exposure of each pack the gradual development of the identifying process could be followed. A second measure was obtained by recording the number of promptings required to complete the learning of each of the six packs. Finally, subjects were asked, at the end of the learning and testing, to define their concepts by drawing them.

The gross findings When the results are examined it is apparent that the learning was incomplete at the time of the test: there are five failures out of the first 12 exposures of the characters in the first test pack (VII), and for every 12 characters on the 216 test-measures there are four failures. Hull's subjects were still in the process of acquiring their concepts at the end of the test series.

In order to study the effect of guidance Hull assisted some of his subjects in the task of isolating the identifying radical embedded within each member of a family of characters. In his main procedure Hull never pointed out this clue; nor had he directed his subjects to look for some common identifying characteristic. And, indeed, many subjects never discovered the identifying marks of the class, although they were taught to identify every card in the six packs correctly. In one series, however, Hull replaced some of the characters by the isolated radicals. In half of the instances the radicals were placed in the *learning* series, and in half they were placed in the *tests*. Two kinds of tasks, therefore, were studied: (1) one in which the radical's names were learned and then the radical had to be discovered, embedded in more complex characters, and (2) one in which the names of the complex characters were learned and the tests were made with the identifying radicals.

The results of this special test showed that the two procedures were of equal difficulty. Out of 108 possible responses the radical-trained subjects

made 56.2 errors in naming the test figures. Those trained on the complex figures made 53.6 errors on the test-radicals. Individual variations (26 to 87 errors) make the difference in the averages statistically insignificant.

When the subjects were asked to define their concepts by drawing their idea of what a character must contain to be called an *oo*, and so on, a pronounced difference in the procedures appeared. Independent scoring of their drawings by judges who did not know which procedures had produced the drawings gave the radical-trained group a score of 71.2 per cent, the complex-character-trained group a score of 38.4 per cent. These results indicate a difference between *functional efficiency* and the ability to verbalize or schematize. And the results add a third, and more surprising conclusion: the ability to define the common characteristics in a group of objects is not a good indication that a learner can successfully classify and name *new* objects that belong to these classes. Verbalizing or schematizing a concept and *using* the concept are two different things.

It should be noted, again, that the subjects in this section of the experiment had achieved about a 50 per cent efficiency in the naming task.

Combined guidance and undirected search In one of his series Hull alternated the simple radicals with the complex radical-embedded characters. The first pack was composed of the simple radicals, the second pack of the complex characters, the third of simple radicals, and so on. Compared to the usual procedure with the complex characters alone, this alternating method gave a test series in which 2.4 out of every 12 characters were misidentified. The same subjects missed 4.6 characters out of every 12 in a control procedure utilizing the usual arrangement of complex characters alone. Judged by the promptings required to learn the packs, the advantage of the method appears from the start.*

Presenting the radicals in situ One way of directing attention to the "oo-ness of the *oo*'s" would be to point to, emphasize, underline, or outline in red or other contrasting color that radical that is the distinguishing mark of the class. Testing the effects of such procedure, the experimenter found that saturating the radical with red increased accuracy in the test series (3.2 errors out of 12 vs. 4.7 errors).

* Other distributions of the simple radicals and various distributions of the proportion of time spent on the radicals and the complex characters should be tested. Koch found in maze learning of rats that guidance concentrated at the beginning, but guidance used sparingly, proved to be an aid to efficiency. Guidance in the later trials, and too much guidance, proved an inefficient use of time.⁸

The curve of learning In a final variation of his procedure Hull presented all 144 characters to his subjects, one at a time, with the usual 5-second exposure for each character and the usual prompting method, before any character was exposed a second time. Mounted on a continuous cloth belt, the characters could be exposed until all could be named correctly. When learning curves were plotted for each subject they were found to be sigmoid in shape. That is, a long period of no apparent progress was followed by a rapid rise in the curve; and this rise was followed by a gradual decline in the rate of improvement until, finally, on a plateau of nearly perfect responses little or no improvement was made within the limits of the experimental period.

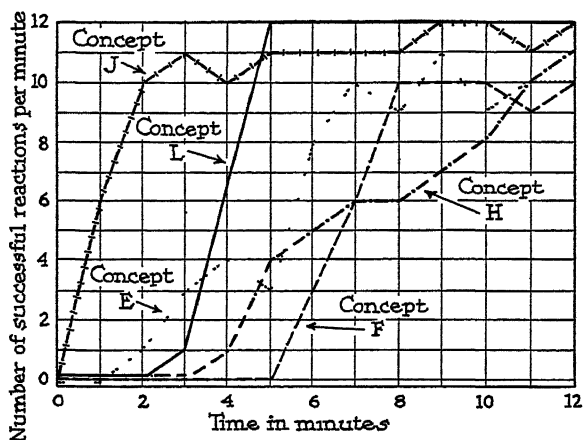


FIGURE 114. Typical curves from Hull's study, showing the evolution of concepts in one subject. [From Hull, p. 77.²]

When the data were analyzed so that the emergence of single concepts could be studied, subject by subject, more abrupt transitions were noted. Figure 114 gives the results for five concepts for subject Cha. . . . The family of characters labelled F, for example, did not give any sign of being identified until the exposure apparatus had been running for five minutes. By this time 60 of the 144 characters had been shown. Within the next four minutes the F-family (the *lngs*) were being correctly identified ten times out of twelve. The rise of concept L is even more rapid, moving from zero at the end of two minutes (after two packs had been shown) to 100 per cent efficiency at the end of the fifth pack and remaining at this level from this point on. The curves for this subject indicate that.

One. The abrupt rise follows trials in which the reactions are uncertain. Some of the pre-insight learning is gradual, like the curves for CR's. The curve for the H-family is like that obtained in the typical trial and error performance of the animal learner.

Two. The "insights" seldom achieved 100 per cent efficiency. In the curves for Cha . . . only one of the concepts operates at this level in all tests. Functionally, the insights are of all degrees of perfection.

Three. There is a stage in which a functional concept produces correct discriminations in most tests, but the subject cannot identify the cues that initiate the naming and classifying. He has hunches, merely. The process of generalization is working automatically but it has not yet brought the subject to "lift out," discriminate, abstract, the conceptual cue. The degree of functional efficiency does not always reveal which type of process is going on in the subject.

Major Conclusions of the Hull Study: Critical Comments

The examination of Hull's data serves to emphasize the following points.

One. To be able to give the class-name of an object is not an indication of the ability to define the common characteristics of the class, or to identify the cues on the basis of whose presence the classifying and naming are done.

Two. To be able to define the common characteristics of a limited number of the members of a class of objects is not an indication that new and unfamiliar members of the class will be properly recognized, classified, named.

Three. Guidance enhances the ability to define the traits of a class, but the mere isolation of the defining characteristics does not guarantee their functioning *in situ*. The field work of the biologist, the clinical training of the interne, the shop-work of the mechanical engineer, add an essential phase in the training of a learner to use his concepts. Rather than complete guidance, the guidance which is alternated with practice in which cues are worked with *in situ* shows an advantage when measured by the practical test of ability to handle novel materials.

Four. The procedures and choice of materials used in the study tended to favor a type of conditioning rather than a conscious search for the identifying characteristics of a class of objects * Learning was not carried to comple-

* Criticizing the work of earlier investigators, Hull described the deliberate and self-conscious search for common elements as a "pseudo-problem." From this standpoint it would seem that the scientific venture itself is a pseudo-problem. Hull's own labors in the field of learning theory called for a most rigorous formulation of the data, and his training of a generation of graduate students in the art of formulating and testing concepts in this field would indicate that in the field of his professional interest he was most keenly aware of the advantage of a conscious search for unifying principles. Cf. his *Principles of Behavior* ⁴

tion, subjects were not informed as to the efficient procedure, objects were presented singly so that comparisons and contrasts could not be easily made, and a limited test of functional efficiency was counted sufficient proof of the attainment of a concept

Five. The task Hull selected was that of *naming*. In his own plate, which presents his Chinese characters, he labels the column showing the radicals common to each family of characters, "concept." He uses as his test of the presence of a *functional concept* the ability to name. The drawing test was not always used and the results of this test are minimized in his summary. As a result the data apply more to the externals of the concept-forming process than to its essence, and they leave us in doubt as to whether Hull really measured concept-formation. In a fixed series of 12 characters a subject learns to attach a name. But this can be achieved to a 100 per cent level and still fail to function on a subsequent test series. The incomplete transfer of the training would seem to indicate that *mere naming is not truly functional*. No true category has been formed, no essence isolated, no concept formed.

Kuo's Study of Inductive Inference

A second study making use of Chinese characters appeared shortly after the publication of Hull's monograph.⁵ Kuo used instructions that directed the subjects to the task of memorizing English equivalents exposed along with 88 characters, and then tested the subjects for the meanings of radicals that had been present in the compound characters used. Radicals were recognized as familiar ("I recognize it by its looks") when no meanings could be given; and some subjects (16 out of 60) were able to name every one of the 88 characters without discovering any of the groupings or family-relationships.

By means of various hints and negative instances Kuo led his subjects to discover all but 7.6 per cent of the possible categories. While the ability to memorize the meanings provided the subjects with the raw material for the groupings, his best memorizers did not spontaneously discover a greater number of concepts. Some subjects reported concepts when they could not recall a single instance to validate them, a third had less than three instances (out of the possible 15 in each category).

In Kuo's materials there were several alternate sub-categories within each main group. These sub-categories permitted the subject to believe he had found validation for false concepts. For instance, in a *female* group all but one case (*tutress*) could be classified as *relatives*; several in a *metal* group could be classified as *money*. These alternate meanings provided the most

serious stumbling blocks, and prevented some subjects from utilizing Kuo's hints and negative instances. The correct category had to be learned against the partial reinforcement. The lists that contained many instances to support the alternate categories were the difficult ones.

Slightly more than half (54 per cent) of the concepts formed occurred "spontaneously." How many of these were discovered by subjects who "spontaneously" took up the search for concepts, giving themselves directions not in Kuo's protocol, we do not know. But the data indicate clearly that the grouping and concept-forming process is something more and other than simple recall. Memory provides the raw materials, the positive and negative instances. Yet there is also an indication that in some instances (5 per cent in this study) these raw materials may still lie below the threshold of recall when the class-name is first used.

Smoke's Study of Concept Formation

Smoke presented his subjects with series of geometric figures, each series of figures being constructed according to a single principle (for example, a circle and two dots, the one dot being inside the circle and the other outside of it).⁶ The members of a series varied in the details of their construction (color, size, line-width, relative position of parts). Each series was given a nonsense name (for instance, *dax*, *vec*, *zif*). The subject was asked to discover, for example, what a *dax* was, and when he had done so the functional efficiency of his concept was tested on a series of 16 test-figures, half of which were true *dax*'s and half of which were confusion-figures, which violated the principle at some single point. Within the series of confusion-figures, each part of the principle was violated in at least one figure. Within each single figure there was but one such violation.

Smoke's emphasis, like Hull's, was upon the functional concept. He credited his subjects with having the concept when they made a faultless discrimination. And he found that such discriminations were accompanied by faulty definitions in more than one-third of the instances. (We are left in doubt as to whether such correct discriminations could be duplicated on new test materials, and in the absence of an arbitrator feel that the concept-forming process is incomplete in such instances.) *

Smoke's subjects were in about the same position as the child who is surrounded by adults who have arrived at concepts and classifications of objects, and who use words to designate their functional groupings. The

* If we step back and observe the psychologist working at the task of forming a concept of concepts we might apply Smoke's criterion to the larger task. Certainly the definitions of a concept do not all agree. And there are functional differences which go along with these criteria.

child "catches on" in time, learning the properties (and consequences) of classes of objects along with their name. In the course of his learning he will make many false generalizations and will, in effect, cross the class-boundaries that the adult automatically respects. When he calls the corkscrew a "crooked scissors" or the horse a "big dog," confusing his categories (in our opinion), we insistently correct him until his name-calling is correct. Long before he has anything like a verbal definition, before he can analyze out the essential cue which is responsible for his naming, he will be calling them unerringly; and he will have adjustive mechanisms for the group before he is conscious of the group, as such. (As a matter of fact very few of the categories adults use have the precise differential marks of Smoke's geometrically constructed figures, *intentionally* built upon a principle)

When we say that the concept is that symbolic process which makes possible the faultless discrimination, we have inferred (if not re-ified) something that lies behind the observed behavior. Smoke suggests that we might be closer to an adequate definition of a concept if we could give a precise bio-physical description of this "something behind successful discriminative naming." We would then be indicating the precise "neuro-muscular and neuro-glandular events that must occur before an individual may be said to have learned a concept." In spite of various efforts to locate the "generalized symbolic process" in sub-vocal, gestural, or neural mechanisms, we have no direct study of such mechanisms at work. The studies of Jacobson and Max, which have demonstrated the presence of implicit movements in thinking, finger-movements in the thinking and dreaming of normals and deaf-mutes, action currents in musculature used in representing objects not present to the senses, and the like, made no attempt to differentiate movements involved in conceptual thinking from other types of implicit response.⁷ In the work of Goldstein and others, partially reviewed below (page 611), there is evidence that injury or disease affecting the frontal lobes is apt to be accompanied by a deficit in abstract thinking, by a dependence upon concrete modes of procedure. But even granting the correctness of these data, to locate the damaged tissues whose loss eliminates a function tells us little about the functioning of healthy mechanisms. The effort to locate complex functions, to physiologize abstractions from studies of total organisms adjusting to total fields, smacks too much of an earlier faculty psychology and its accompanying phrenology.

Perhaps, therefore, it is wiser to keep close to the operational definition, consistency of differential response. We should emphasize the fact that there are many degrees of consistency, that the indicators of a class may be more or less sharply discriminated, and that communicable definitions vary in

their exactness. The all or none criterion which our ordinary concept of concepts would lead us to apply is sharper and more definite than the behavioral facts would indicate. The boundaries in nature are less precise than those we draw in thought.

We are, at this point, very close to an ancient and honorable definition of a concept—a general idea that stands for a group of similar objects. We have a rough bio-social criterion to indicate *when* it is present, and we can describe in approximate fashion *how* it develops in an experimental setting. Our description indicates that the borders of the territories marked out by these general ideas are of varying degrees of vagueness or precision and that something akin to a non-conscious, non-reportable, *functional* general idea is present in the early stages of our discriminations. In Reed's study, which follows, we shall find further evidence on the nature of these general ideas.

Reed's Study of the Learning and Retention of Concepts

The tasks assigned to the subjects in this series of experiments⁸ place the latter in a position somewhat analogous to that of a person learning a foreign language, or to that of the anthropologist trying to build up a grasp of an unwritten primitive language with little to start with but the observable behavior, the general functioning of tribal life in its setting.

The materials Reed employed were simple: a series of cards on which were printed from four to twelve words, a set of six nonsense syllable names for six groups of these cards. A sample list of 42 cards and their names follows:

<i>Name</i>	<i>Content</i>
1. Kun	horn leaf monkey debt
2. Vor	brook leave claim precious
3. Yem	roses suit juice plum
4. Bep	club picnic reaches beet
5. Dax	answer highest airplane red
6. Jik	pine hear speak chalk
7. Yem	fight tablet chair poppy
8. Kun	fame ought tiger saucer
9. Bep	potato careful pasture raised
10. Jik	across oak floor sorry
11. Vor	lover borrow flower point
12. Dax	anywhere green aloud apple
13. Vor	honey idle breaking bread
14. Jik	pencil cedar just crossing

15. Yem	doesn't spread dandelion stuck
16. Bep	crawl turnip pleasant closet
17. Dax	board beast blue butter
18. Kun	line people elephant sound
19. Vor	broken darling load pearl
20. Kun	uncle fried sheep pear
21. Yem	enough hitch lily tangle
22. Jik	break knee maple eyes
23. Dax	building purple believed plus
24. Bep	call o'clock carries spinach
25. Yem	sunflower ditch shade stir
26. Jik	bid know file walnut
27. Vor	barrel sweetheart hurried noisy
28. Bep	coffee pilot clay carrot
29. Dax	bunch brown borrow prince
30. Kun	crowd sail deer string
31. Bep	berry nickel tomato calm
32. Dax	maid arrow lean yellow
33. Jik	because sugar elm meat
34. Kun	horse circle paid scholar
35. Yem	toward leader pansy treated
36. Vor	banana haste dear minutes
37. Dax	orange beat ankle knives
38. Yem	laden daisy disgust cranky
39. Vor	believe cigar owe love
40. Kun	carrying died cow ruler
41. Bep	urn cabbage crown swept
42. Jik	air hour cheat cottonwood*

In his first experiment his subjects were divided into two groups. The subjects in Group I were given the following directions:

"This is an experiment in learning concepts. A concept, you know, is a word, or idea that stands for any one of a group of things. Thus, the word chair, bird or stone stands for no particular chair, bird or stone, but for any one of a group of chairs, birds, or stones. I am going to show you a number of cards, one at a time. Each of these cards will be named by a nonsense syllable, such as jok, bif, or hex, and *each nonsense syllable is a concept.*

* H. B. Reed, "Factors Influencing the Learning and Retention of Concepts I. The Influence of Set," *Journal of Experimental Psychology*, 36 (1946), p. 75. Used by permission of the American Psychological Association, Inc.

Look carefully at all the words on the cards and try to learn as soon as you can *the name of each card* and what it stands for. At first you will not know the names of any of them and I shall have to prompt you. I shall always prompt you when you fail to tell me the name of a card within three seconds after it has been shown. When I have given the name of a card *repeat it aloud after me* so that I can be sure you understand it. Your work will be finished as soon as you can name each card without any help ”*

Group II was merely instructed to learn the names of the cards. The method of exposure and prompting was described but nothing was said about concepts, or groups of objects with a similar name; and there was no hint that the subjects were to think of nonsense syllables as concepts.

The learning materials for each of the six concepts were provided by seven cards distributed in irregular fashion throughout a series of 42 cards. The subject's task was therefore to find some clue, something about the seven cards that determined the nonsense name; and since the *dax's*, for example, were separated by intervening cards, the subjects had to rely upon their memory a great deal. Introspective reports, in answer to such a question as, "What suggests *kun*?" were taken every third trial. Finally, the subjects were asked to state their answer to the question, "In what ways have you tried to learn the names of these cards?"

Reed's conception of a concept Reed's notion of a concept is very much like that which was proposed in Smoke's definition. He says, "A concept is defined as any word or idea that stands for any one of a group of things . . ." Learning a concept, in this context, would seem to involve the discovery of the category the experimenter had in mind in constructing each of the sets of seven cards. The categories themselves are not new at all (the *kun's* are all animals, the *bep's* are vegetables, the *dax's* are colors, etc.) and once the task became clearly defined the subject's problem was to learn which familiar category went with which nonsense name. In contrast with the inductive search in which the category itself has to be discovered or constructed, the present study is a task in which already familiar knowledge is to be applied. All that is required is to discover the *occasion*, and *which* bit of knowledge.

The subjects were left quite in the dark, however, as to the nature of the clue that was to be used. One is reminded of the example quoted by Ogden and Richards. A missionary, wishing to learn the word for table, tapped a table surface, asking a group of boys who were standing nearby, "What is

* *Ibid*, pp. 75-76.

that?" From the five he received five replies, one boy giving him the word for tapping, the others supplying the words for material, covering, table, hardness.⁹ As would be the case with any foreigner overhearing a word repeatedly used in a certain context, there is the problem of discovering which object or aspect of the context is the thing referred to by the foreign word.

Because the concepts are not new the experiment might well be called a study of the method of discovering familiar or "embedded" concepts. The task differs from that of the anthropologist studying a strange culture where unfamiliar groupings of objects, or human beings, are involved—as, for example, a unique family structure in which the tie between a child and his mother's brother is much closer than that between the child and his own father. Here it is required that the investigator learn new terms, new relationships. He will discover that his own categories are repeatedly violated (as when, for example, reds, purples, greens are all grouped together, given a single color-name because they are all present in the colors of a certain parakeet).

Knowing that a nonsense syllable was the name for a group of cards gave Reed's subjects but a limited clue as to the precise nature of the task. For example, the subject was still free to take the verbal materials as so many objects, as so many odd diagrams, within which some part, or position, or relationship was to be discovered functioning as a sign for a particular nonsense name. The experimenter did *not* state: "The words are to be looked upon as symbols, they are to be studied in terms of their meanings, the concept defining a class is indicated by *one* of the words on each card, one and one class only is represented on a set of seven cards given the same name, the categories are all familiar ones." The subjects were left to discover these "directions."

The majority of the subjects found the correct orientation to the problem. Group I, with the more complete instructions, discovered the type of concept the experimenter had in mind in 86 per cent of the cases. Since the promptings were continued until *all* the cards were correctly *named*, we can see that 14 per cent succeeded in the latter task either by sheer memory or by faulty concepts. In the case of Group II this latter method accounted for 33 per cent of the cases.

Reed speaks of two types of concepts, *consistent* and *inconsistent*. He credited his subjects with discovering consistent concepts when they could name the proper category, or if they could name the key words belonging to that category (Until this latter method is tested with new members of the class it would seem to be a matter of uncertainty as to whether we are

dealing with a mere memory-aggregate or a true concept) The criterion of an errorless trial could be reached by a subject using *inconsistent* concepts if he merely learned the first words on each of the cards representing a certain nonsense-syllable-group. Thus a *vor* would be an appropriate name whenever a card beginning with brook, honey, lover, broken, barrel, banana, or believe, appeared. (It is questionable whether we should use the word concept in this case) Or the subject might look for common letters or sounds. One subject asserted that the y at the end of pansy seemed to belong to *yem*. Some of the inconsistent concepts were obtained by a search for a key letter or syllable. One subject thought, at the end of trial 6, that all *vor* cards contained words in which the syllables *bro*, *bre*, *bar*, could be found.

The *inconsistent* concepts, as the term is here used, required more promptings. At the end of six weeks the recall of this group was nearly as good as that for the consistent group (89 per cent as against 96 per cent). When these values are compared with those for nonsense syllables (16 to 18 per cent) the advantage of some organization—even when it is the complex and confusing sort of organization obtaining in the inconsistent concepts—is apparent.

The two procedures When both consistent and inconsistent concepts are considered the set to learn names only averaged 40.85 promptings per concept, the direction to learn concepts required 30.70. Not only were more consistent concepts formed under the direction to learn concepts; but these consistent concepts took but 29 promptings as against 37 promptings on the consistent concepts achieved under the set to learn names only. Evidently the subjects hit upon a more efficient procedure sooner under the directions to learn concepts, even though the directions were somewhat ambiguous. What was the nature of the more efficient procedure, and how did it differ from that which resulted in inconsistent concepts?

An example Subject 7, described as a superior student, proved to be one of the slow learners, clinging to a method that yielded *inconsistent* concepts. The instructions, in this case, were to learn names only. The subject observed the experimenter during the first trial, paying little attention to the cards themselves, and asking at the conclusion of the trial, "What am I supposed to do?" At the end of the third trial she saw the y at the end of *pansy* and associated it with the y in *yem*, and she now thought that a word with a c in it suggested *kun*. By the sixth trial she could name the first card of the series, remembering from its position that it was a *kun*. *Vor*, she now thought, was the name that should be given when a *bro*, *bre*, or *bar* appeared

in the first word of each card. The *yem's*, she thought, usually had a *y* in the third word, but sometimes in the first word. This subject grew discouraged, crying at the beginning of the eighth repetition and exclaiming, "I can't do it." She required 389 promptings and 18 trials to reach the criterion of an errorless trial, and an average of 64.8 promptings per concept as against 41 for the group of subjects working under these instructions. Her retention was so good after 3 weeks that she required but one prompting per concept in order to achieve the criterion.

A procedure of this type, which characterized Group II to a greater degree than Group I, and was common in the inconsistent-concept group, makes a very difficult assignment out of the experimental task. Looking for some sense and consistency in the cards and syllables, the subject pitches upon first words, letters, syllables, slang associations, common letters between the nonsense-syllable name and one of the words, and so forth. *And these relationships work, part of the time.* The subject is enabled to anticipate the experimenter in naming some of the cards, thereby receiving a kind of "reinforcement" for his faulty hypotheses. The extinction-value of his failures has to work against such successes. In addition, before he can arrive at the criterion of an errorless repetition he will have to discover the exceptions to his rule, introduce qualifications and *ad hoc* hypotheses. No merely statistical solution will release him from the task (as, for instance, 67 per cent of the *vors* begin with either a *bro*, a *bre*, or a *bar*). This subject's final formula will have to be enlarged to run:

Vor is the name of all cards containing the syllables *bro*, *bre*, *bar*, *bor*, *ban*, *bel*

But an exception occurs when the syllable is followed by *knee*, and when there are two such syllables on a single card.

And these syllables must be discriminated from the following similars which appear on cards having other names; *boa*, *bee*, *blu*, *but*, *bec*, *ber*, *bid*.

And since there is also a *dax* which contains the word *believed*, *bel* is not a *vor* when it is followed by *plus*. (The words on this card are building, purple, believed, plus.)

Thus the rule becomes almost as complicated as the materials it is supposed to organize and simplify. The list of cues has to be memorized, the exceptions added, and similar but different syllables beginning in *b* have to be discriminated. All of this memorizing and discriminating has to go along with the reinforcing and extinguishing effects of the promptings. In the

early stages when the developing rule is only partially formulated and retained, fixations will develop around the partially correct concepts, and confusion will enter as expectations are not gratified. Moreover, as the faulty hypotheses are eliminated and new ones advanced there is a tendency for the subject to continue working in the same general direction (making other analyses of the same faulty type) since hypotheses of this type are at least partially successful; 389 promptings did not alter the direction of this superior student

The tremendous simplification that is achieved when the subject sees the relationship in meaning between such words as precious, honey, lover, darling, sweetheart, dear, love, is enough to account for most if not all of the efficiency of this mode of conceiving. With the insight all the subject has to remember is the one simple unifying meaning; and 6 of these meanings enable the subject to handle all 42 cards. A mode of conceiving (of classifying the stimulus words) permits 6 associations to do the work of dozens.

In the discussion of the results Reed comments as follows: "*Psychologically*, any concept which leads to the correct or desired response may be called correct, but *logically* this is not the case"¹⁰ And again, "Concepts logically formed are learned more quickly and better remembered than those *illogically* formed"¹¹ thereby implying a difference in the process of arriving at the end result. But the data Reed presents suggest another interpretation. Actually the instance of inconsistent concept formation which we have described shows the subject looking for hypotheses, analyzing the cues, looking for relationships, testing, rejecting. The period of doubt ("What am I to do") in which the problem takes shape, the trial and error advancing of hypotheses, the evaluation and checking, are all there. The one unfortunate aspect of the "illogical" search is the fact that these subjects misapprehend the nature of the task, seek to break up the word lists into letters, syllables, and the like. But their mode of procedure *within this direction* is very much like that of the consistent ones. The inconsistent group is searching for concepts; but for poor ones (as this experimenter has defined the task). The real distinction would seem to lie between those who do not sense that there is any "rule" (any category) at all, and the classifiers. The former treat each case as unique, the name as a purely arbitrary speech movement.

The variability in the effects of reinforcement If we were to look upon this experiment, from the outside, as a kind of conditioning experiment in which the card is the conditioning stimulus, the experimenter's pronouncement of the nonsense-syllable name is the reinforcing (unconditioned stimu-

lus), and the subject's pronouncement of the syllable after the experimenter is the unconditioned response to the unconditioned stimulus, then we should have to account for an extremely great variability in the abilities of the subjects and in their procedures. The promptings on a series of 60 cards sometimes varied from 92 to 397, the trials from 3 to 13, the time from 24 to 120 minutes.

The analysis of the inconsistent procedure explains the difference in results, in large measure. What the stimuli mean to the subject, how they are perceived and organized, what the subject believes is the reason for the reinforcement—all these factors determine the effect of the reinforcement upon subsequent performance. Stated differently, there is an *in-between process*, a stage of perception, reflection, interpretation, in which the response to the stimulus is developed and elaborated and related to earlier responses. It is the implicit behavior going on prior to the reinforcement that is affected by the latter. The two most rapid learners simplified the task, looked for class words from the start, and could quickly eliminate their errors and consolidate their successes. The slow learners took the wrong direction, found cues that were partly successful, clung to these partially successful responses, floundered about within an area vaguely defined by their faulty direction, and had vague responses reinforced.

The wrong reasons for the right concepts The basic similarity in the two procedures is demonstrated by the reasons the subjects gave for their responses. Curiously fallacious and non-logical procedures crop out in the *consistent* group, some of whom arrived at workable categories via superficial cues, chance associations. Some of them claimed that they had chosen the particular class name (or meaning) because of identical elements in the word on a card and in the nonsense syllable. "My roommate goes with a girl name *Lavora*, so I associated *vor* with *love*." Another insisted, "*Kun* is a German word for *can*. Animals *can* do things, so *kun* is an *animal*." Another said, "First I noticed *love*, turned *ov* around and that made it *vo* as in *vor*." Another subject pointed out that a *dax* card had *orange* as the first word¹²

Now it is conceivable that these verbal reports of the subjects are to be taken at face value, that these aspects of the stimuli are indeed the ones that determined their responses. There is reason to be skeptical, however, that these are anything more than a grasping at some kind of explanation, a kind of rationalization of a process of which the subject is only partially aware. Certainly, to judge from everyday experience, we are by no means aware of the sources that produce every thought, and it would be surprising if an

introspective method of this sort could reveal all that it is necessary to know about the origin of concepts. But if we grant a certain amount of truth to the subject's reports, we can only conclude that the *consistent* concepts are also influenced by factors that governed the inconsistent ones. The "logically formed" concepts are influenced, at least in their emergence, by the same non-logical sensory qualities, the same striking effect of primacy, the same similarities in sound rather than sense. But this sort of process was not all, there was *hindsight* in the recognition of the category that had emerged (for whatever non-logical reason) and a consistent employment of the class-concept thereafter. The chance discovery of a category and its consistent use are two quite different things.

The right reasons for the wrong concepts A common error of the subjects who made the correct approach, looking for class names, was to choose categories that were too broad, or too narrow (as compared with the ones arbitrarily chosen by the experimenter). Their *procedure*, however, was much like that followed by the subjects who succeeded. Their chief fault lay in overlooking the negative instances, in remaining content with a partially correct formulation. The inadequacy of these concepts would have appeared, as in the case of all inconsistent ones and some consistent ones, as soon as the subjects were tested on new illustrations of the same concepts, a test nowhere applied in Reed's procedure.

Conditions favoring the discovery of consistent concepts We have already seen that the instructions to look for the meanings of the group of cards with a common nonsense-syllable name favored the emergence of the consistent concepts. Even more effective was an increase in the length of the series. Keeping the number of concepts constant Reed varied the number of illustrations of each concept. Series of 24, 42, and 60 cards were used. The number of *promptings* increased with the length of the series, but not proportionately.

Number of cards	Number of promptings required	
	CONSISTENT CONCEPTS	INCONSISTENT CONCEPTS
24	19	34
42	29	40
60	32	49

In spite of the fact that all subjects participating in this section of the experiment were given the instructions to look for concepts, the shorter list produced a majority of inconsistent concepts. As the list increased in length, a greater *proportion* of the consistent concepts appeared

LENGTH OF LIST	NUMBER OF CONSISTENT CONCEPTS	NUMBER OF INCONSISTENT CONCEPTS	PER CENT OF CONSISTENT CONCEPTS
24	53	73	42%
42	98	16	86%
60	119	7	94%

It would seem that in spite of instructions the shorter lists permit the subjects to "catch on" to the nonsense names, by one cue or another, and to memorize the nonsense-syllable names without knowing why they fit the cards. The sheer amount and confusion of material in the longer list presents too great a burden for memory and powers of discrimination. Also, the longer lists, by presenting more examples, force the subject to discard one inconsistent concept after another as he finds that cues that work in part have too many exceptions. Since the inconsistent concepts are apt to be misleading in dealing with new illustrations of the same concepts, the learning of such inconsistent concepts would have no transfer value. One of the gains from the utilization of many examples in any practical learning situation is here illustrated. Increasing the number of "examples" from 24 to 60 more than doubles the percentage of consistent concepts and requires less than double the amount of work (as measured by the number of promptings). And the increase in the length of series does something more than stamp in the correct responses by increasing the number of repetitions. Qualitative shifts, changes in the direction of approach to the problem, increase the amount of transferable skill.

The effect of increasing the complexity of the stimuli Reed ran a series of experiments in which the stimuli on the cards were made increasingly complex and confusing. The number of words upon a card was increased up to 12, and the words on a given card were permitted to belong to more than one category. Thus, on the *dax* cards there was one category present throughout (color); but five *dax* cards bore words belonging to *tools*, four bore

words belonging to *clothes*, and three to *school subjects*. Thus the same type of confusion that was inherent in the inconsistent concepts now entered to trouble even the consistent concept approach. The number of promptings increased, the percentage of consistent concepts fell (from 86 per cent for the simplest series through 58 per cent, 21 per cent, and 12 per cent as the complexity was increased). An increasing tendency to base the identification of a card upon the first word in the card, and upon such factors as frequency, recency, sensory similarity, was noted. The difficult errors to eliminate are the competing concepts that are partly right. Evidence indicated that the frequency with which the members of the competing groupings appeared on the cards determined the strength of the tendency to use the competing concepts.

Reflections on the Implications of Reed's Data

As in the work of Hull, Smoke, and others, Reed's subjects showed that they could achieve an errorless performance without actually learning the correct concepts. By isolating various adventitious cues they could achieve a kind of mechanical accuracy without understanding the task the experimenter had intended to set for them. Two extremes favored this kind of solution. (1) the short and simple lists which could be easily solved by mechanical methods (and sheer memorization), and (2) the complex word groups with confusing alternate possibilities. In the latter case the subjects were led to grasp, finally, at any cue that could bring them to their goal.

The actual procedures of the subjects seem to be similar in the successful and unsuccessful solutions. The difference in success seems to be dependent upon the direction of approach to the problem. The importance of clear instructions to the learner in order that his experiences may give a cumulative insight into the structure of his problem is emphasized. With one set, or mode of conceiving, the reinforcements produce improvement, gains, organization of responses. With a different set the same objective reinforcements introduce confusion, more repetitions are required, and the outcome (though an errorless performance) is of no value in meeting further examples of the same problem. The data also show that instructions which seemed clear to the experimenter and which the subjects could repeat (giving verbal evidence that they had heard and retained the instructions) were nevertheless often inadequate as a means of directing the subjects' approach to the task. Either the verbal instructions require greater care in formulation, or actual orienting tasks which put the learner through the desired performance and enforce the correct approach are required. It is not simply a matter of intellectual

capacity. Even the "superior student" required 389 promptings to reach an errorless trial, and then arrived at a solution that was valueless from the standpoint of transfer. Another "equally bright" student with a different approach found the solution in eight trials, averaging 22 promptings per concept, and achieving the transferable type of solution. Intelligence achieves solutions when it operates along such correct directions.

Although the majority of subjects took what might be called a categorical approach, no matter what directions were given to them, and searched for some kind of generalization (even when it was the inferior type) there were instances in which the subjects were unaware of what they had successfully achieved and were unable to generalize. They learned one correct category but took up a fruitless approach to other cards. They utilized class names in one instance but did not appear to realize what it was that had made their approach successful in this instance. Though their behavior had been successful, they did not "make a map of it," did not realize its essence, did not reflect upon it. This crystallization of behavior into an awareness of what has just been done seems to be the crux of passing from a functional concept into the insightful procedure which is transferable to new materials. In the fully defined stage of concept formation there is a reflection upon what one is doing, a reaction to one's reactions.

The isolation and study of this transitional phase, as well as the detailed analysis of the pre-insight phases, constitute an important task that remains to be executed. There is a suggestion that in this pre-insight stage there are "fuzzy" concepts with poorly defined borders, procedures in which the subject has a "feel" for the materials but is unable to communicate or accurately describe his procedure, unable to define the cues which he is using, unable to state the precise direction he is taking. There would appear to be a stage when the relations between a group of words are actually having an effect even though these relations are not consciously perceived; but the detailed analysis of such pre-insight learning must remain for experimental evidence accumulated in carefully planned fashion. As one type of evidence supporting this notion there is the observation of Reed to the effect that when consistent concepts fail to appear during the learning of the original list they sometimes appear at the very beginning of the relearning phase. Sometimes, too, enough of the learning experience persists so that consistent concepts appear in reflection, during the rest interval.

One is reminded here of the numerous instances in which solutions to problems emerge suddenly, full-blown, in an interval between intensive work periods, when attention has been turned in another direction. Thus Poincaré, the mathematician, found the solution to an obscure problem in geometry

that he had worked on long and intensively but had recently dropped completely for a brief respite and an excursion, popping suddenly into consciousness as he was getting on a bus, without anything in his former thoughts paving the way for it. Such instances as these have inclined many to accept the hypothesis of an unconscious reasoning process which continues beneath the threshold of awareness. Such a process is thought of as continuing the sifting, testing, comparing, and reorganizing of experience, and only finally thrusting the finished product into the foreground of attention.

But there is another "unconscious" process which seems to be involved in the process of evolving concepts, the gradual changes in behavior produced by the trial to trial reinforcements and failures prior to insight. The pre-insight trials do something to the subject and make a difference. The question is: Do these reinforcements of objectively present but un-perceived relations facilitate the emergence and final dominance of these relations, just as a "striking quality" or position of primacy can affect a subject without his realizing that it is this that draws his attention to a particular cue? Or do these un-perceived relations fall by the wayside entirely? There is no question that a set, a direction of approach, a mode of conceiving, can make them extremely ineffective. Recall the 389 promptings without the subject catching on! In spite of repeated exposures, promptings (reinforcements) the insight does not emerge. But this does not happen for the majority of subjects. The fact that there are transitional stages in which the subject has the names but not the essence of the category, or when he uses the category in one case but not another, or when he can select the right cards but has the wrong reasons, would all suggest that there is a conditioning process that operates steadily prior to the appearance of the insightful phase. The subject "gets warm," his approach is deflected toward an area or in a direction, he makes successive approximations and even arrives at a performance that satisfies certain limited and pragmatic criteria (it works) before the precise and correct formulation appears. In spite of a succession of false diagnoses and false perceptions his behavior swings toward the correct solution. There seem to be unconscious reasons for the behavior that finally becomes conscious, non-logical bases for the action that he is finally able to rationalize in correct fashion. Yet it would seem that, compared to the potency of the set, these more or less external factors, which lie in the situation and in the objective process of reinforcement, operate fairly slowly, and their steady pressure can fail to break the restrictive framework of a false definition of the problem. Unless the partial successes and objective reinforcements do break through this false set, and unless some degree of understanding is achieved, the subject's performance on the next example of the class will be

uncertain. Where there is no understanding then, indeed, transfer depends upon common elements. But if there is some measure of understanding and insight, then the new example of the class may have no *elements* common (as far as the objective stimuli go) and yet it can evoke the correct response. So long as the symbolic value of the stimuli and the meanings of the stimuli are constant, so long as the conceptual approach and the organization of the field are the same, transfer will operate.

A note on organization and recall Numerous investigators have pointed out the importance of organization for retention and recall. The present experiment with its high percentage of retention over a 6-week period is another case in point, stressing the superiority of meaningful material over nonsense material in this respect, and stressing the superiority of the simple and consistent concept over the inconsistent and complicated mode of organization.

In the present instance, however, the greatest differences are not between the consistent and inconsistent concepts. This difference (less than 10 per cent) is much less than that which obtains between earlier work with unorganized nonsense syllables and the organized groupings in this experiment (18 per cent recalled vs. 89 per cent and 96 per cent). For all the fact that the organization imported by the artificial (inconsistent) concepts seems *ad hoc*, external, complicated, it permits 89 per cent of the names to be recalled six weeks later. Though these concepts prove worthless for handling new material, though they are arrived at by a more mechanical and plodding kind of memorization, they permit a high degree of retention. The terrifying thing would seem to be that the meaningless and the mechanical types of organization are *retained*, not that they are so quickly forgotten. If we could say that where there is no understanding there is no generalization, and no transfer, then we would not fear the outcome of poor teaching, faulty education. Unfortunately the ignorant recall and generalize with the greatest of ease, and false concepts are retained and applied almost as readily as the "one true mode of conceiving." Our habit of generalizing is one of our commonest substitutes for intelligence; and poor concepts have an unfortunately low mortality rate.

Perhaps the point most clearly emphasized by these figures given by the present study is that *any* organization facilitates recall and that *any* mode of conceiving has a tendency to be revived and applied to similars. It is this mechanically operating inertia factor—a lower-grade capacity that makes any learning at all possible—that the good concepts of the efficient reasoner have to work against.

A note on educational implications The essence of the difference between the two types of procedures, and the resultant concepts, is that one procedure yields transferable results, the other does not. The clue that is important to locate, in any learning situation, is the mode of conceiving, the direction of approach; for the practical question is the question of transfer. The teacher is required to know whether the categories he is teaching and the modes of classifying, which his pupils are learning, are the ones that will prove useful to those being trained.

Is the world best approached by the modes of conceiving we are teaching? Or does it contain so many unseen possibilities that we would do better to teach a process of discovery rather than modes of classifying? In periods where the world seems stable, where convictions are deep-lying and unchallenged, the deductive approach to education dominates. When life consists of a round of constant tasks we endeavor to provide the next generation with the one correct mode of approach. In other periods where there seems to be a need of new directions every restrictive force must be lampooned, exposed, broken, destroyed. The deductive emphasis upon the "eternal categories" now appears restrictive. Instead of teaching the old concepts by methods that smack of animal training, the emphasis should shift to the teaching of the nature of concepts, to the subjective factors in their formation. Instead of finding concepts *in nature*, instead of looking upon the categories as eternal essences which bind the separate events into one meaningful whole, the learner should be invited to view them as highly subjective, as relevant to the purposes and needs of the reasoner.

We could wish that this shift in emphasis would take place naturally at such times as it is needed. In the area of the social sciences, where conceptions are rapidly changing, it would seem both natural and wise to hold our concepts lightly, to recognize them for what they are (that is, *possible* ways of organizing the data of experience). Then we should be able to reorganize them, to develop new ones when the inadequacy of the old ones becomes apparent. Yet it is precisely within this area that our defensive prejudices are most potent: here we grow adamant, appeal to universals, teach The One True Way. Here we call for a dictatorship in education, for the elimination of dangerous thoughts, for the purging of our schools. To find the teachers who are themselves sufficiently free from the bondage of the ancient categories to be able to teach an inductive approach is not easy; and to secure for those we do find sufficient academic freedom from all those societal forces involved in the defense of an established order is even more difficult. To name the educational task, if our education is to be truly rational, does not make the task easy. At the very time of crisis when the challenges to

the accepted categories require us to think, the issues suddenly become "not debatable."

CONCEPTUAL AND EMPIRICAL SOLUTIONS CONTRASTED

There is a great deal of human behavior that can be classified as "trial and error." It differs very little, if at all, from that of the animal confined in the problem-box. Impulsive, overt, the actions are evoked by the stimuli and modified by their consequences until, shaped by the course of events, they function fairly automatically. In addition to this trial and error behavior man has the capacity to *represent* the problem-field, to delay overt responses while a thought-model is manipulated, to hold a direction until the thought-model solution emerges, and to apply such solutions to action in the field. Particularly when a diffuse anxiety makes him unwilling to act until he can "see his way clear" this representative faculty converts him from an impulsive creature into a thinker and reasoner.

The manipulations of the thought-model are most commonly of this same trial and error kind that we observed in the animal, only now carried on symbolically. Facing the situation, withholding overt action, the thinker says to himself: "If I try this, then that will happen. If I try that other thing, then those other consequences will follow. If A, then B." Where the materials of a problem-situation are unfamiliar, where there are many new relationships for which he has neither words nor experiences to call upon, the human thinker sometimes resorts to a three-dimensional model; but again the essence of the function remains the same. It is representative, the acts are experimental and reversible, the solution is carried back into overt, final, consummatory behavior. If the model is accurately built, a good replica of the problem field, he gains two things: he can manipulate experimentally without the danger of irreversible consequences, and he can represent what neither the language response nor the anticipatory adjustments can symbolize and hold, accurately. He can hold, in the stable structure of the model, what his fluid anticipatory adjustments cannot. Thus a boy building a radio set and working with materials that to his limited budget seem very costly, may lay out a cardboard panel and try various arrangements of parts before the cutting and drilling and soldering. His procedures, too, are largely cut-and-try; but they are tentative, reversible. The anxiety which gave him pause, which arrested his overt blunderings in the materials, is reduced. So a manufacturer, in doubt about the plans for the construction and operation of the

new plant, may construct a miniature furnace, set up a "pilot plant" with a complete layout, in order to further test and validate what has proved too difficult to integrate otherwise. The reports of his superintendents, the architect's drawings, the actual raw materials, can all be brought together in three-dimensional space, and put through manipulations that symbolize the plant-to-be. Interrelations may appear which could not be anticipated from the summaries of the specialists. As soon as the thought problem reaches any degree of complexity, some model, either verbal or diagrammatic, or some three-dimensional replica, is required. Our capacity to manipulate, in thought, is limited, particularly in new materials.

The resort to the three-dimensional model may seem to some to be an abandonment of thought, for action, but the experimental character of this action makes it functionally equivalent to the other forms of verbal-symbolic thought. The resort to the model represents a certain lack of confidence in the adequacy of representations in the other symbol-systems.

Whether we use words or three-dimensional models, the everyday language or the high-power concepts of science, the most critical phase of the process is the building of the model. If the boy, in laying out his cardboard form, uses dimensions that are incorrect, then the subsequent cut-and-try process will yield false conclusions. If the pilot plant does not faithfully represent the substances, operations, temperatures, of the plant that is symbolized, manipulating it will produce false conclusions. The *essential* relations must be symbolized; and *all* of the essential relations must be there.

Yet there are many non-essentials that the model-builder will do well to omit, and this trimming away of the non-essentials makes for efficiency. Even in the verbal model we discover that substituting the letters, A,B,C for the terms of propositions will free us from the distorting prejudices everyday usage has coupled with the terms, prejudices whose distorting force leads us repeatedly into fallacies. But the trimming will always be limited by the true essentials of the problem, by the necessary or inherent relations of the materials, and since we resort to thought models only when there are unknowns this trimming (or abstracting) will always carry the risk of error. When we say that his success in abstracting depends upon his *sagacity* we have done little more than name the quality of being a good abstractor, and if we succeed in building an adequate model of the reasoning process we shall have some hint as to the complex array of factors underlying such sagacity. In any case the truth of the conclusions worked out on the model will require the test of application. If the solution we work out on the model does not work in practice, we have to re-examine three stages of our operations: (1) building the model (Did we represent all the essential items?), (2) mani-

pulating the model (Were our operations correct, logical, exhaustive?) and (3) applying the solution

One other advantage possessed by such models may be named. They enable us to journey through interstellar spaces, to follow the path of light from sun to moon to earth, to range the inhabitants of London beside those of New York, comparing them in measurable qualities, manipulations can be performed on the thought-model that are difficult or impossible to execute, in actuality. *Scientific constructs* are such thought-models which enable us to peer within the atom and the cell, to envisage an expanding universe, and to do all sorts of practically inexpedient things. But these thought voyages via the model have to return to earth, to the common or garden variety of experience. No model can dictate what the nature of reality must be. Properly used, the model is always anchored on two sides. On one side we put into the model the raw data of our experience, the problem out of which our thinking arises, and on the other hand we return the model's solutions to be tested in this same field of experience. The test of the artilleryman's pencil and paper model is the hit upon the target. The test of the scientific construct lies in its ability to improve our solutions of practical problems. The test of all the excursions on these thought-models, whether to the other side of the moon or to the "mountain-top experience" of the mystic, lies back in the valley of everyday experience.

Behavior without a Thought-Model

Much of human behavior remains un-thinking, sub-rational, impulsive. Instead of delaying action until we can develop an adequate thought-model, we act impulsively, habitually, on a rule-of-thumb basis. With no theory of the intervening links to join our action to its consequences, we behave as trained animals do. Such an unhesitant, un-thinking "know-how" might be called non-logical. Sometimes it is described as *empirical*. We place our nickel in the vending machine, and if nothing comes of it we bang the box. What does happen inside the box? We know not; but we are vaguely hopeful that it will jar something into motion. The inexpert listener frequently behaves in similar fashion when his radio does not function. What his banging on the radio cabinet can possibly do to tubes, transformers, and the like, he does not understand in the least. Indeed he may have no thought-models for such objects at all.

There is much in modern medicine that is not far from this "banging on the cabinet." One thinks of the various forms of shock therapy which are so generously applied to patients suffering from various nervous disorders. An investigating committee of the Society for Psychosomatic Medicine has

recently reminded the members of the society that electro-shock therapy is a purely empirical procedure, that it has no rationale of theory (no adequate thought-model) to recommend it, that its sole demonstrated therapeutic advantage is to shorten the period of hospitalization for the depressed patient. The temptation to do *something* to alter the status of a mentally disturbed patient is quite understandable, and when the causes of the disturbance are unknown, the use of such drastic measures as convulsive shocks is also understandable; but it places the reasoning powers of the physician and the status of his "science" on a par with that of the novice who thumps his radio cabinet.¹³

Because such empirical procedures actually have limited success, and because our scientific conscience now demands a rationale for every procedure, physicians employing this shock therapy are endeavoring to toggle up a theory, *after the fact*. Such shocks, it is argued, affect the nervous system profoundly. The diffuse convulsions and tremors which involve the entire musculature of the subject are initiated by electrochemical effects produced by the shock and acting directly upon the brain centers. Place this fact against the background of centuries of animistic thinking, which posits a mind in the brain and thinks of mental alienation as a disorder of the brain, and we are ready for a final filling in of the thought-model. We then have some such theoretical construction as Sakel's, who argues that shocks break up the brain paths, the rut-formations, the bad mental habits that are at the root of the disorder; and once these mental grooves are broken up the mind is free to return to its older and more normal functioning. It was the recognition of the inadequacy of such a thought-model that led the investigators to describe shock therapy as "purely empirical."

But often we do not even attempt a thought-model. We plant the potatoes at the right phase of the moon, go fishing when the bloom is off the water, vote the Republican ticket, put blue ribbon on the bonnet of the male child, and so on, not because there are good reasons for our action, not because we possess a thought-model that tells us precisely what would follow what if such and such manipulations were made, but simply because this is what one does. We conform to the mores, repeat the opinions current in our clique, vote with the gang.

During World War II there was a tendency to speed up education, to crowd thousands of young men through courses in physics, electrical engineering, in record time. Boys were taught to repair a standard radio kit, to make routine check-ups and substitutions of parts so automatically that they could be executed in the dark (as might be required under combat conditions). But in the haste to turn out men who knew "what to do when," there

was not always an interest in teaching them *why* this particular "what" should be done. The educational process tended to descend to animal training, the imparting of empirical knowledge; and the theory, the thought-models, the in-between processes, were dispensed with

Where experience is routine, where all the situations are standard ones for which a standard set of habitual responses will suffice to handle our need-tensions, animal training functions in the place of reasoning. But such training would not equip the repairman to build a radio set from the ground up, to deal with a new model, to develop improvements in the circuits. He would have little to think with, and little to do, once the routine repair operation had been tried and proved unsuccessful—except to bang on the cabinet or order a substitute set.

The poverty of our political and social thinking is not unrelated to this same poverty of the thought-model. When business is bad and taxes are high we can "throw the rascals out" or grouse about Congress, or those bureaucrats in Washington; but we do not think too successfully about the problems of government. We find the political cartoons in our newspaper amusing; if we were to try to think with them we would be as helpless as Colonel Blimp. Even the more pretentious models (economics, political science, sociology) are sometimes made to serve other purposes than thinking and problem-solving, and in such cases bias enters into their very structure. When we operate such models so as to arrive at conclusions that will be applicable in the real world we find them less than efficient; and this lack of efficiency need not lie in the working of the model. Our logic may be faultless. Our conclusions can not be more correct than the model. We can understand this in the case of the cartoons, readily. If capitalists were all bloated and greedy (as the cartoons say) and if labor leaders were all bearded Bolsheviks, racketeers (as certain columnists would have us believe) *then* the operations the cartoonists and the columnists would have us perform would yield satisfying conclusions. The history of all earlier thought-models of society suggests that those we now consider final will also, one day, seem as absurd as some of our contemporary cartoons.

Observing the Manipulation of a Model: Solutions with and without Transfer Value

Although there is much trial and error in our use of thought-models there are differences in procedures which have important consequences. And there are vast differences, among model-manipulators, in their degree of understanding of the process itself.

Consider the "water-dipping test" which has frequently appeared in tests

of reasoning and intelligence. One version of the problem runs as follows:

"The liquid contents of an 8-quart container are to be divided into two equal portions of 4 quarts each, using only the 8-quart container and two empty jars which hold 5 quarts and 3 quarts respectively."

Now the "reasoner" may proceed in purely random fashion, pouring the liquids back and forth. He does not need to have the containers actually before him but can make the operations "in his head" (as we so animistically say). But aside from the ability to use the materials in this symbolic fashion the "reasoner" may behave with little greater insight than the dog trying to worry a stick through a fence. The symbolic pouring of the liquids back and forth may involve repeated false starts, the repetition of errors, and—even when the liquids are divided equally, with 4 quarts left in the large container and 4 quarts in the 5-quart jar—the "reasoner" may be quite unclear about the stages through which he has gone. If he tries to demonstrate the process to another, and especially if he is given another problem with new values substituted, he may have to resort to the same random blundering. For example, if he is asked,

"How can you bring up from the river exactly 6 quarts of water when you have only a 4-quart and a 9-quart pail to measure with?" or

"Three jars with capacities of 19, 13, and 7 quarts are to be manipulated so that you can measure out 10 quarts. The first is empty, the others full. How should you proceed?"

it is apparent that he has barely learned any generalization beyond "keep trying and you may succeed."* His single success has taught him no principle, and as yet, he has found no solution applicable to a class of problems. The error, in such trial and error, remains prominent. Solutions are time-consuming. And if his random and symbolic pourings fail to yield a solution he will be in doubt as to whether there is, in fact, a solution. He knows merely, as his trials fail, that if such a solution exists, he has not found it.

Now it may very well be that no *principle* is involved, that there are no

* In the case of the third problem given above, there are 16 stages in the solution, and these must be completed in sequence. Without some machinery of record his errors will recur, and he may spend effort upon them without recognizing their futility. The sequence is too long for his memory. The solution involves the following stages:

Jar	Amount of liquid in each jar, by stages															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
19-Quart	0	7	19	12	12	5	5	18	18	11	11	4	4	17	17	10
13-Quart	13	13	1	1	8	8	13	0	2	2	9	9	13	0	3	3
7-Quart	7	0	0	7	0	7	2	2	0	7	0	7	3	3	0	7

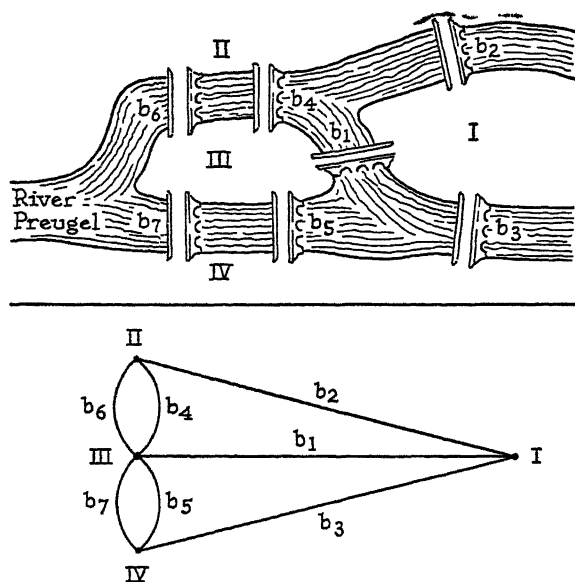
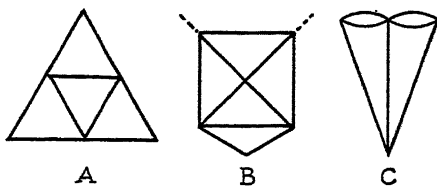


FIGURE 115. The problem of the Königsberg bridges. Above: Sketch of the seven bridges. Below. Schematic form of the problem. The islands and mainland become points, and the bridges become lines. [Based on Tucker and Bailey, "Topology," *Scientific American*, January, 1950. Also, Ball and Coxeter, *Mathematical Recreations and Essays* (The Macmillan Company, 1947).]

essential relations in a problem of this type; and assuredly, if this were the only problem of this type one were likely to meet—aside from the sheer amusement in seeking such a solution—it would not be worth the time and effort required to locate such a principle. In this case blundering would continue to be the method, and the solution would remain purely empirical. We could suggest that the learner try manipulating the differences between the volumes of the containers so as to find the required number through the use of "remainders." Then his simple arithmetical habits of addition and subtraction will function. We could suggest that he follow the order of events that seems to work for the maze-learner. define the end-volume in terms of the containers and their differences and proceed to work the problem backwards. But all such reasoning remains at the trial and error level, or very close to it. Any improvement in efficiency must depend upon sheer memory and upon increasing facility in internalizing the models.

The difference between a solution that is stumbled upon, and one that can be clearly stated in the form of a principle is more clearly illustrated with other materials. Graham, for example, gave his subjects bent wire puz-

FIGURE 116. Three of Graham's figures *A* has no odd branchings and can be traced unicursally, starting at any point. *B* has two odd branchings and can be traced unicursally, starting at dotted line *C* (Konigsberg problem) has four odd branchings and cannot be traced unicursally. [From Graham, in *Journal of Experimental Psychology*, p. 97.¹⁴]



zles and asked them to discover the crucial measurements in the construction of the puzzle. He provided them with calipers, rule, graduated blade thickness, bits of soft wire of different diameters, and several puzzles. He says of his learner-subjects that they tried to "get an answer, rather than to learn how to get answers." That is to say, in the simple bent nail puzzle they came up with a single figure, " $\frac{1}{16}$ inch," instead of such a generalization as "The size of the openings that will barely permit separation will be slightly more than one-half the diameter of the wire"¹⁴

He also gave them so-called unicursal figures, and here there is an even more striking difference between the blind, random, "empirical" solution and the solution that arrives at a generalization. In this problem the subject is assigned the tasks: (1) of tracing a geometric figure without lifting the pencil from the paper, crossing, or retracing lines, and (2) of discovering generalizations that would enable him to diagnose new figures and determine whether they were soluble or not (and why!). The problem originated in a memoir presented by Euler to the St. Petersburg Academy and involved the question as to whether a person could proceed from any point in the town of Königsberg so as to cross every bridge in it once and only once and return to the starting point. The river Preugel, which runs through the town, was crossed at that time by seven bridges, as shown in Figure 115. What Euler did was to reduce the map drawing to a simplified schematic form and then to develop a theory for such figures. This theory has later been developed, in a branch of mathematics known as topology, into a set of propositions and demonstrations which admit of but one answer. Sample figures, used by Graham in his experimental study, are shown in Figure 116.

Now it is possible to proceed empirically, by trial and error, and through actual manipulations arrive at solutions for some of the figures. In some cases a subject will not be able, within the reasonable time allotted for his trials, to arrive at a solution. Even with longer periods he may become discouraged and conclude, either that the problem is not worth the effort or that it is in-

deed insoluble. But he will not *know* that it is insoluble unless he arrives at the principles and generalizations that a mathematical analysis reveals. For example, some of Graham's subjects discovered what the mathematicians had worked out: (1) Any figure that has no odd branchings at any point can be traced unicursally, starting at any point (An odd branching is a node—or island—from which an uneven number of branches are drawn) (2) Any figure that has two and only two odd branchings can be traced unicursally if the start and end occur at the odd branchings (3) Any figure that has more than two odd branchings cannot be traced unicursally.

Additional generalizations are also possible and the propositions can be demonstrated in a convincing manner. Without going into the development of these generalizations it is apparent that the subject who has discovered them is in a quite different position from the one who has merely the experience of having blundered through a solution. This latter subject has not isolated the significant variables, has not hit upon the essence of the problem which will enable him to diagnose new figures, and he will not know whether his failure to solve the problem is a matter of boredom, persistent errors, insufficient trails, or the fact that the problem is indeed insoluble. The completely proved and understood solution has a coercive quality. There is the assurance that ALL of the possibilities have been exhausted, every possible manipulation covered.

Training in Reasoning: Possible and Impossible Problems

We would do well, therefore, to hesitate before being satisfied with a purely trial and error description of the thinking process. Clearly, even though much trial and error is involved on the road to the insight into a principle, there is a vast difference between the "resting stages" arrived at. The empirical solution that satisfies the particular case will work in the particular case, and so long as this standard situation is the only problem presented the reasoning has a practical efficiency. Progress in human thinking involves a steady progression to more and more general solutions, toward more and more certainty that the possibilities have been exhausted.

Graham tested the effect of some preliminary training in achieving generalizations upon the kinds of solutions achieved with the unicursal figures. His fore-exercises resemble somewhat Maier's "lectures" (see page 351) to his subjects, and they show a similar effect. In addition to stressing the importance of isolating crucial variables, of noting similarities, uniformities, groupings, of searching for relationships, and of not being content with a solution until a principle is formulated, he gave them exercises illustrating these principles. The exercises involved quite different materials (such as

finding a short-cut method for squaring numbers ending in five) but permitted an emphasis upon each one of these features of the process of achieving a generalization. Graham's subjects who were thus instructed found good generalizations in a greater proportion of the cases (77 per cent) than comparable but uninstructed subjects (55 per cent).

The principles of which we have been speaking are ways of conceiving a problem, ways of formulating a procedure, ways of analyzing a field so as to isolate and emphasize an aspect that is applicable to a whole series of fields. Such principles provide the bridges from one experience to the next.

Graham complains that his subjects do not spontaneously seek such principles, that they tend to come up with purely local solutions. They have to be prodded to produce generalizations. And he is of the opinion that "our educational programs and procedures have too long neglected the development of skills in discriminating and generalizing" ¹⁵

If Graham is right, then the teacher who wants to "train his students to think" should be directed to modify his procedures so as to develop an understanding of the thinking process itself. The so-called "laziness" or "dependence" of students is apparently a trait that is general enough to appear in the laboratory study. This preference for the "pat answer" is related to a number of conditions. Among them we might mention four:

One. It is easier to learn a generalization that someone else has discovered than to discover it. And it is much easier to teach the answers than the method of securing answers. In seeking educational short-cuts the teacher can guide his pupils so completely that they learn answers rather than the process of discovery.

Two. The teacher does have the answers, in many fields. It is foolish to pretend to the contrary, implying by the response to the student's question that the teacher is equally curious as to the answer. "That is an interesting question," some teachers—trained in "progressive" techniques—have learned to say. "Let us see if we can discover the answer." This deceives no one, and students have been conditioned by too many teachers who are interested in teaching the answers with a minimum of effort.

Three. The schools require the assimilation of generalizations discovered by others at such a pace that there is frequently little time left for the student to learn the nature of the process of discovery. Yet in protecting the learner from the painful and slow process of discovery we are guilty of an intellectual "over-protection" which weakens his rational powers.

Four. We respect, sometimes, the encyclopedic intellect, overlooking the non-rational quality of all knowledge acquired by "animal training."

In teaching this process of discovery many examples presented in close juxtaposition seem to be necessary in order to force out the false modes of conceiving. The person who is required to work with a range of problems has special reasons for discovering the kind of principle that provides a key for the series. He will approach the later members of a series with the response that has been discovered (or conditioned), and if it proves to be a poor key to the situation the shock of failure will make him reconsider his former apparent success. Met with singly, each problem might well be solved empirically, by trial and error, and one solution is as good as another. Meeting them *en masse*, or *seriatim*, a person can well afford to take time out to work out the principle running through the group.

The person who wants merely the *practical* solution, who merely wants to solve this particular problem, pass this course, does not want anything of any truly practical value, after all, such solutions are applicable to one case only.

As ordinarily defined, a concept is a mode of conceiving, a mode of dealing with a whole group of related phenomena. Paradoxically, the possession of such concepts saves us from the burden of thinking. They save us, that is, from the painful necessity of forever making a fresh search, from analyzing and ordering the data, from the anxious search for the right handle to our problems. But of all human tools they are the most dangerous. Their very facility can lead us to by-pass a much needed analysis of the novelty before us. Reinforced by many "successes" the strength of the model can overwhelm our powers of direct perception; and we write off attempts to find solutions as "impossible," because the thought-model says so. Misused by those who do not fully appreciate its nature, the concept is a stereotype, blocking the successful issue of our thought. Correctly used it cuts with razor edge to the heart of a problem.

THE EVIDENCE FROM PSYCHOPATHOLOGY

We turn to the field of psychopathology in the hope that those "experiments of nature" such as are produced by faulty development of the nervous system, brain injury, tumors, and cerebral disease may reveal some of the dimensions of the reasoning process. If we accept the views of those who look upon the schizophrenic as one who has "lost his reason," how shall we expect him to cope with tasks involving reasoning? And if the development of reasoning powers in the evolutionary series has been parallel with the development of a forebrain, how will the patient perform after the neuro-

surgeon has removed large portions of each frontal lobe? How is the judgment of the neurotic patient affected, and precisely wherein is the intelligence of the feeble-minded deficient? It is our hope that the exaggerations produced by injury, disease, surgical removal, or faulty development will serve to highlight those functions at work in the normal performance.

Goldstein and His Pupils Study Frontal-Lobe Functions

For the past three decades Dr. Kurt Goldstein and his pupils have contributed many studies of patients with damage to the cerebral cortex. In their work two influences have predominated. (1) on the one hand they have sought for levels of behavior, for a hierarchy of functions, rather than for specific and isolated performances which disappear as specific areas are damaged, following in this respect a tradition established by Hughlings Jackson; and (2) they have followed a qualitative approach to the patient, less interested in accumulating statistically impressive results of tests than in achieving an understanding of the significance of the patient's behavior—an interpretation of performance in the light of the needs and purposes of the patient.

The psychological changes that follow injury to the frontal lobes are manifold and are not easy to classify. In contrast to the deficits that follow damage to the motor area (paralyses and incoordinations apparent to casual examination) and the loss in sensory and perceptual capacities that follows lesions in the temporal and occipital lobes, the frontal-lobe deficits are obscure, pervasive, and so difficult to measure that the neurologist once referred to these tissues as the *silent areas*. However, recent study of patients with bilateral prefrontal lobectomies* has identified precise changes. Brickner's patient showed lack of restraint, boastfulness, self-aggrandizement, distractibility, and "inability to synthesize," none of which traits had been prominent in the pre-operative personality of the patient.¹⁶ Character changes (usually for the worse), sexual lapses, depressions, excessive emotionality, disorientation in space and time as well as to ordinary social and ethical restraints, torpor, slowness of reaction, irritability, distractibility, and inability to project plans and purposes into the future, have all been named as characteristic of the frontal lobe patient. The disorders seem to cut across the ancient triumvirate of feeling, intellect, and will, impairing each of the three basic dimensions of mental life.

There is a strange "spottiness" in the patient's performance, however.

* The prefrontal areas are the most forward-lying portion of the two symmetrical halves of the brain. When these portions are removed from both sides, the operation is referred to as a bilateral prefrontal lobectomy.

Brickner's patient, who had shown gross character changes and an inability and unwillingness to return to his former work on the stock exchange, achieved a normal adult level of performance on the intelligence tests. A task that seems superficially to be the same will be performed under one set of circumstances, failed completely in another. Goldstein's studies have convinced him that the key to these vagaries in performance lies in a distinction between tasks that are concrete and those that require an *abstract* attitude toward the problem situation. The frontal lobe case takes the world and its objects in an immediate, unhesitating, literal, concrete fashion. His mental grasp of a situation is limited to the routine, the stereotyped. Brickner felt that his patient had not achieved a new idea since his operation; and Goldstein found his patients unable to make new organizations and groupings of the material placed before them. Instead of tentatively transforming a perceived situation into a series of possible modes of conceiving and then selecting the one most suitable to his present needs and purposes, the patient behaves more like the dog with a log on his favorite spot at the fireplace: he walks around it, forced to take the world as it is, in its first intention.

If such a patient is kept within a highly simplified and unchanging environment—as, for example, in the hospital for wounded veterans—his existence seems to run along smoothly, and he will give little evidence of his defect to the casual observer. He is sometimes described as extremely meticulous and orderly, placing every object in its appointed place and living through his routine day as though it were a ritual. It is as though, having vaguely recognized his limitations and seeking to avoid the anxiety that disorder or changing routines would induce, he clings to his rituals for support. Even the blank, unruled sheet of paper is a source of embarrassment to him, and he may be unable to perform in a simple writing test, whereas with ruled paper he can write without hesitation.

The patient's need for support from the concrete and familiar is also shown in his inability to imitate and to give a make-believe demonstration. The full-bodied flesh and blood situation seems to be required. For example, he can manage the glass of water, raise it to his lips, and drink; but he sits puzzled and confused when the experimenter asks him to demonstrate how he would drink *with an empty glass*. He can lick the crumb from his lips—there is no paralysis—but he can't show the experimenter how to stick out his tongue in controlled fashion. He can take the key from the experimenter's hand and open the door; but without the key he is unable to give a mock demonstration of how a door is opened. He can't represent it, can't talk about it, can't think about it. He seems to have the "know-how" in his organism, but not in symbolic form.

Since all of his deficits here described seem to be part and parcel of his loss of the ability to take an abstract approach to his problems, we might do well to note precisely what Goldstein sees in this deficit.

"We can distinguish normally two different kinds of attitudes which we call the concrete and the abstract. In the concrete attitude we are given over passively and bound to the immediate experience of unique objects or situations. Our thinking and acting are determined by the immediate claims made by the particular aspect of the object or situation. For instance, we act concretely when we enter a room in darkness and push the button for light. If, however, we desist from pushing the button, reflecting that by pushing the button we might awaken someone asleep in the room, then we are acting abstractively. We transcend the immediately given specific aspect of sense impressions, we detach ourselves from the latter and consider the situation from a conceptual point of view and react accordingly. Our actions are determined not so much by the objects before us as by the way we think about them; the individual thing becomes a mere accidental example or representative of a 'category.' Therefore, we also call this attitude the categorical or conceptual attitude. The abstract attitude is basic for the following potentialities:

1. Assuming a mental set voluntarily, taking initiative, even beginning a performance on demand.
2. Shifting voluntarily from one aspect of a situation to another, making a choice.
3. Keeping in mind simultaneously various aspects of a situation; reacting to two stimuli which do not belong intrinsically together.
4. Grasping the essential of a given whole, breaking up a given whole into parts, isolating them voluntarily, and combining them to wholes.
5. Abstracting common properties, planning ahead ideationally, assuming an attitude toward the 'merely possible,' and thinking or performing symbolically.
6. Detaching the ego from the outer world."*

In another connection Goldstein writes:

"In 'concrete' performances a reaction is determined directly by a stimulus, is awakened by all that the individual perceives. The individual's procedure is somewhat passive, as if it were not he who had the initiative. In 'abstract' performances an action is not determined directly and immediately

* Kurt Goldstein, *Language and Language Disturbances* (Grune & Stratton, Inc., 1948), p. 6. Used by permission.

by a stimulus configuration but by the account of the situation which the individual gives to himself. The performance is thus more a primary action than a mere reaction, and it is a totally different way of coming to terms with the outside world. The individual has to consider the situation from various aspects, pick out the aspect which is essential, and act in a way appropriate to the whole situation. True, this procedure may have various degrees of complexity. Sometimes the situation demands nothing more than a singling out of one property of an object, as, for instance, when we are asked to sort objects according to their colors. In the highest degree of complexity we have not only to apprehend objects by means of certain simple characteristics but to choose aspects for consideration in accordance with a certain task which demands a conceptual organization. Even in its simplest form, however, abstraction is separate in principle from concrete behavior. There is not gradual transition from the one to the other. The assumption of an attitude toward the abstract is not more complex merely through the addition of a new factor of determination; it is a totally different activity of the organism. Perhaps it would be better not to designate both conditions by the term "behavior", since behavior connotes real activity and is especially well suited to the concrete performance. Abstraction represents, rather, a preparation for activity; it involves an attitude, i.e. an inner approach, which leads to activity. Therefore, it is better to speak of an attitude toward the abstract. Real action is never abstract; it is always concrete. The difference between the two conditions is shown in the difference between the processes which precede action. In the concrete situation, action is set going directly by the stimuli; in the situation involving the abstract, action is begun after preparation which has to do with consideration of the whole situation."^{*}

In order to further the abstraction process for ourselves let us look at the series of examples Goldstein offers to illustrate his patients' deficits. We may begin with one of his patients who suffered from Pick's disease. This disorder is a somewhat obscure type of degenerative process which frequently involves the frontal lobes. In the present case X-ray studies confirmed the suspected atrophy of the frontal areas.¹⁷

A CASE OF PICK'S DISEASE The patient is described as a quiet, orderly woman of 56 years, born in Sweden. Since the onset of the disease, her husband reported, she had shown a progressive deterioration in behavior. For a year and a half she had grown increasingly forgetful; she read the

^{*} Reprinted by permission of the publishers from Kurt Goldstein, *Human Nature in the Light of Psychopathology* (Cambridge, Mass.: Harvard University Press), pp. 59-61. Copyright 1940 by The President and Fellows of Harvard College.

same stories over and over again without recognizing them as familiar, she forgot her cooking and burned food as a result. Following the death of a brother she frequently imagined she saw him, running out on the street even when undressed to talk to him. She became tired easily, complained of being "mixed up" in her thoughts, became sloppy in her personal habits, and was frequently confused as to the identity of persons outside her own immediate household.

As she adapted to the hospital life the staff found her compliant, able to eat without help, ready to talk with nurses and patients, able to dress herself, and willing to help in the work of the ward. She greeted the doctor cordially, and talked with eagerness and expression. The physician described her conversation in these words: "the formal course of conversation, the rhythm and the structure of sentences are unchanged. . . . (and) she is much interested in the point under discussion." On the other hand her behavior was markedly stereotyped, she never volunteered to act on her own initiative, she washed only when urged by the nurses, and undressed under similar urging. She had to be pushed into action by a concrete situation. For example: .

"After a short conversation she was asked what she had been doing during the day. She answered: 'I am working.' When asked where, she offered to lead the way to the workroom (This room is situated on the upper floor of the hospital.) She went directly across the floor to the end of the ward, where there was a closed door, and glanced at the nurse, apparently desiring her to open the door and realizing that it was locked. She opened the door with a key given to her, locked it from the outside, returned the key to the nurse, went straight to the elevator situated on the other side of the corridor, rang correctly and entered it on its arrival. On reaching the floor of the workroom she left the elevator at the direction of the operator, went directly to the door of the workroom and immediately took her place at the table. She then asked for her needlework from the supervisor of the workroom, prepared her material and started to knit. All this was done without the least hesitation and with vivacity. When asked at this point to put away the needlework and to accompany the physician, she became startled, seemed bewildered and was reluctant to do so. Great effort was needed to move her. Eventually, she arose and left, taking the correct route out and heading for the elevator. When stopped before she reached the elevator while still on the same floor, which is identical in structure with the floor on which her ward is located, and led into the corridor, she believed it was the floor on which her ward is located. She

then walked through the corridor as if she were on the ward floor and turned to the right at the end of the corridor as though she were about to enter her sleeping room. She was surprised to find herself in a room unknown to her. When told that she was on the wrong floor she became perplexed and looked around but was unable to find the correct way to the ward. She not only was ignorant of where she was but did not know how to return to the ward.”*

Dr Goldstein emphasizes the fact that the route she successfully took to the workroom was complicated enough. It is not that she is unable to perform when confronted with a concrete situation with which she is familiar, but that she is unable to give an account of, to represent, to think about what she does. She cannot describe the route which she can take; and she cannot give any notion of the plan of the building or the relation of the floors. She can behave, but has no schema. Here is behavior without a thought-model.

The sudden interruption, the change in directions which demands a shift in attitude, precipitates a state of confusion; and the patient experiences emotion. Where the patient is perplexed because of his inability to comprehend the demands that are being made, when the social environment makes demands that are beyond the patient's powers of comprehension, catastrophic behavior supervenes. A simple task in arithmetic may initiate a burst of weeping or of rage, but the rage is the rage of the inarticulate, the clumsy, rather than a simple release from inhibitory control; for when the environment is kept within a range of complexity which the patient can deal with his disposition is mild enough. In fact he is a bland, easily pleased person, making almost no demands upon his environment. He is not fretful against a routine that would bore and irritate the normal person with its monotony. His lack of imagination, his inability to grasp the overtones and implications of events, his proneness to react passively to an immediate stimulus, his inability to project plans into the future, make him a docile patient so long as the even course of his routine life is undisturbed.

In another case with frontal lobe lesions Goldstein notes what seems to be an emotional dulling. The patient, a male, married, never seemed to express any interest in or concern over his family.

“He never spoke of his wife or children, was irresponsive when we questioned him about them and when it was suggested to him that he should

* Kurt Goldstein and Siegfried Katz, “The Psychopathology of Pick's Disease,” *Archives of Neurology and Psychiatry*, 38 (1937), p. 478. Used by permission.

write to his family he would show cool indifference. Thus he appeared to lack all feeling. Now it was an established practice that he should visit his home, situated in another town, and stay there several days. While at home the patient conducted himself, as we learned, quite as would a normal man in the bosom of his family, kind and affectionate to his wife and children, interested in their affairs, in so far as his ability would permit. After his return to the hospital from such a visit and being asked about his people, he would smile in an embarrassed way, giving evasive answers. He seemed utterly estranged from his home situation.”*

Thus Goldstein would make the emotional changes that follow frontal lobe injury rest upon a basic intellectual defect. Where the patient properly grasps a situation his emotional reactions are adequate; if his grasp is partial the emotional reactions will seem dulled, inappropriate, or as full of anxiety as though catastrophic happenings were impending.

The stick test The distinction between concrete and abstract performances clarifies other variations in a patient's performance. For example, when Goldstein used what he called a “stick test” with one of his frontal lobe cases, he found that if a simple house design was built out of 3-inch skewers and exposed for half a minute, the patient could reproduce it without difficulty, but if a single skewer was placed at an angle (from left below to right above) he could not duplicate it. The letter V was difficult for him, but the opposite arrangement of parts was recognized as a roof and duplicated without difficulty. In short, where the patient could see a concrete object before him his memory functioned; but where he was asked to perceive a more abstract relationship (as in the case of the single skewer), where orientation, direction, schema, have to be formed in terms of a larger spatial whole, he failed. As in the Carmichael, Hogan, and Walter experiment (see page 440) and in the study of Gibson (page 443) these concrete “handles” by means of which the subjects apprehended the test objects often distorted or rotated the test forms, introducing errors in their reproductions.

In another patient the distinction between the “know-how” and the abstract formulation of a task was shown by his ability to adjust appropriately to a test situation in which he was asked to throw balls into boxes successively located at 3, 9, and 15 feet from him. Yet when he was asked how far away they were, or which box was nearer, he was at a loss. He could answer when allowed to walk over to the boxes, counting his steps.

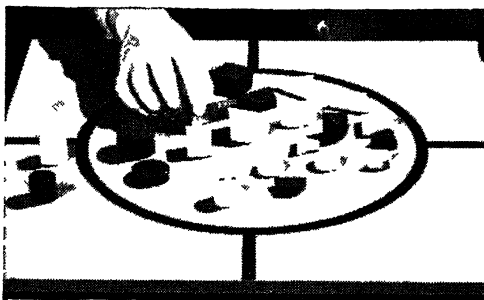
* Goldstein, “The Significance of the Frontal Lobes for Mental Performances,” *Journal of Neurology and Psychopathology*, 17 (1936), p. 35. Used by permission.

The Kohs block test Clinicians have frequent need of a test in which understanding of verbal directions is relatively unimportant. The patient is often asked to imitate a *performance* of the tester, to arrange blocks, and so on. The Kohs blocks provide material for such a test.¹⁸ Devised as a non-verbal test of intelligence, these materials have been adapted to the needs of the neurologist. Originally consisting of nine blocks, the number used with patients has been reduced to four. Ten patterns forming a scale of increasing difficulty are given to the subject to copy. Since the sides of the blocks are colored in different hues, the task is to find the right combination of blocks which will duplicate the exposed printed pattern. Goldstein found that his frontal lobe patients had much greater difficulty in such tasks than his normal subjects. They seemed unable to get away from the figure that was exposed, unable to break up the Gestalt into block sections, and to proceed with the manipulation of the parts. Even a difference between the size of the block-pattern and the test objects confused the subjects. Placing lines between the parts of the test-figure seemed to help the patient to isolate the parts of the pattern and to find the appropriate individual blocks. Nadel, working with similar materials, found various degrees of the deficit, indicating that the dependence upon the concrete approach was by no means absolute.¹⁹ The dominance of the sensory configuration illustrates Goldstein's point in describing concrete behavior as "determined directly by a stimulus." In this instance it is the "present dynamics" of the presented field. In other illustrations the element of stereotypy, of past-determination, seems to be dominant.

The color-sorting test Using skeins of colored wools Goldstein asked his frontal-lobe subjects to construct groupings of the wools, placing together those that "belong together." In general, the patients used smaller classes of one or two skeins, they chose brightness rather than hue (although there was no color-blindness), and they chose pairs that were very nearly identical. Occasionally, surprising combinations would emerge and the experimenter would be informed that the skeins "go together" because this combination would make an attractive ensemble (again the concrete approach).

The object-sorting test A pipe, a potato masher, a match, a book, and so on, placed on a table before the subject, are not grouped into categories of "brown objects," "wooden objects," but are grouped instead as *pipe and match* (used in smoking), *egg beater and bowl* (used in making a cake). The categories are formed from familiar *use and wont* combinations rather than through the abstraction of an aspect or relationship.

FIGURE 117. The Vigotsky Test. [Photo from Oberlin Psychological Laboratory.]



The Vigotsky test Originally devised as a test for the supposed primary deficit in schizophrenia (inability to form and use concepts) this test proved difficult for frontal-lobe cases. The test materials consist of 22 variously colored and shaped blocks of wood, with two thicknesses and two sizes. On the back of each block there is printed a nonsense name, and each of the correct categories has a name. This is explained to the subject, who must proceed, however, without looking at the back of the blocks. When he has made a classification that is incorrect the examiner turns up one of the "wrong" blocks. These promptings tell him, in effect, what the categories are composed of (for when two or three "murs" are thus named before him he now can search for common characteristics). The categories Vigotsky counted correct are large-tall, large-flat, small-tall, and small-flat. This type of classifying test also proved to be one that was unusually difficult for the frontal lobe cases. They proceeded by a sort of blind trial and error and had to be literally pushed into the final grouping by the examiner. Even then, with the categories objectively before them, they could not find reasons for the grouping.

A specific frontal-lobe deficit? Before we conclude that Goldstein's evidence indicates a specific function of the frontal lobes it would be well to consider the fact that other investigators have found these same deficits in young children, in feeble-minded adults, and in schizophrenics; and there is no known common lesion or developmental deficit in these groups. It would seem that the higher *levels* of thinking and reasoning, which involve the ability to abstract from and to transform the perceived field category-wise, are not possible in each of these groups, however much they may differ otherwise.

On the other hand the observations of Halstead seem to indicate that in those patients who have suffered injuries to the frontal-lobe this classifying task is much more seriously impaired than in those cases in which injuries have affected other portions of the brain. Using a battery of tests

which included several versions of the classifying task he found that the frontal-lobe cases showed three times as great a deficit as the non-frontal cases. He speaks of a "biological intelligence . . . (which) is represented throughout the cerebral cortex." His evidence would indicate, however, that "it is distributed in a gradient with its maximal representation occurring in the cortex of the frontal lobes."²⁰ In view of his use of the term "biological intelligence," it is especially interesting to learn that Halstead finds little loss in performance in conventional mental tests. Whatever the conventional intelligence test measures it is something other than the kinds of ability lost following lobectomy. It is also interesting to note that the abilities measured by Halstead are not disturbed by the operation which interrupts most of the paths connecting the frontal lobe to the rest of the brain (the so-called "prefrontal lobotomy").

An all or none function? Some of Goldstein's writings might incline us to expect that the capacity for abstract behavior would drop out altogether, when the frontal lobes are injured. He speaks of it as "a totally different way of coming to terms with the outside world" and insists that "even in its simplest form. . . abstraction is separate *in principle* from concrete behavior." But this is to say, merely, that *conceptually* it is totally different. Clinical cases, or the general population for that matter, do not respect these categories in such a way as to divide themselves sharply into two categories—those who think abstractly and those who do not. Halstead's impairment index shows that every degree of impairment can be associated with frontal-lobe deficit. There are categories, fuzzy categories, pseudo-categories. Like insight, the abstract attitude can be present in greater or less degree.

A Summarizing Sketch of the Frontal-Lobe Deficit

We might characterize the frontal-lobe case, in the light of these findings, as prone to take each situation concretely, simply, literally. He does not view the situation as a whole, but rather as a collection of parts; or, if he does grasp a totality, it is *one* totality only, instead of the many-faceted field of reality, the multi-dimensional world of possibilities which the normal individual faces. He can perform complicated chains of acts, provided they are of a routine character; but even simple tasks that depend upon the in-between process of abstraction and reorganization of the field in the light of the task, prove difficult if not impossible. Paradoxically, he is both extremely distractible and at the same time very stubborn once he has taken up a line of action. That is to say, he perseverates, and finds it difficult to

shift from one line of action to another. He requires more of a supporting situation for his actions than does the normal person; and he finds it impossible to give make-believe demonstrations, to perform imitative acts when there is no real situation to give them concrete significance. Kept in a simplified and stable environment he is placid, easy to manage, and makes very few demands upon his fellows, but when the tasks are beyond his comprehension, and when the sudden shifts in the interpersonal field demand rapid readjustment on his part he experiences mounting anxiety as his performance deteriorates. At other times he seems dull, lacking in emotion. His excitability seems to be the product of an intellectual deficit rather than the simple neurological release of lower centers from the control of higher brain-masses.

Separated from his family he forgets them, and to the normal observer seems calloused and indifferent. In the heart of his family circle his reactions show affection and consideration. His is not life surrounded by a host of unseen witnesses, and sunsets suggest supper time, not heroes' deaths. He seems to have internalized, schematized, symbolized, relatively little of his environment. His behavior is therefore nearer the tropic end of the behavior-scale, ready to be pushed by the instigator-stimulus. With the loss of much of the "behavior environment" there has gone much of what we normally call the self. Actions are limited to the impulses that are called out by the immediately present world, or by the homeostatic tensions of the too-full bladder, the gnawing pang of hunger. Both the purposive and the rational aspects of behavior have deteriorated. He can act when directly confronted with the external maze; but he cannot "propositionize" and he cannot "project himself into the future."

A STUDY OF CONCEPTUAL THINKING IN SCHIZOPHRENIA

The distinction between concrete and abstract approaches to problem-solving has also appeared in studies of schizophrenic patients. Vigotsky, who devised the block-test referred to above, believed that the impairment in conceptual thinking revealed by this test was, in fact, the primary factor in the psychosis; and he interpreted the peculiarities and absurdities in schizophrenic behavior as consequences of this basic defect. Vigotsky looked upon conceptual thinking as a relatively late arrival in the development of the individual, placing the point of transition from the pre-conceptual to conceptual modes of approach at the time of puberty. He looked upon the

disintegration of mental powers in schizophrenia as carrying the individual back to the simpler forms of thought through which he had earlier passed *

The Hanfmann-Kasanin Study

In an extended and painstaking study Hanfmann and Kasanin tested Vigotsky's hypothesis.²² Sixty-two schizophrenics were compared with 24 organic brain cases. Ninety-five healthy controls, of two rather distinct educational levels, were added as a further check.

As a group the schizophrenics were less able to reach solutions on the block-test than the normals. The organic brain cases showed an even greater impairment than the schizophrenics. Using a scale in which a score of 36 points indicated a consistent approach on the abstract level, and a score of 12 indicated a consistently concrete approach, the three groups achieved the following averages:

<i>Subjects</i>	<i>Average scores on the Vigotsky test</i>
Normals	28.5
Schizophrenics	20.8
Organic brain cases	17.4

If the normal control group is divided, however, according to educational levels, an even more striking difference appears. The normal subjects of superior (college) education (most of whom were graduate students and research workers) scored 31.9, while a group made up of hospital attendants, of average education (or less)—and presumably of less than average intelligence—scored 24.8. It is apparent, therefore, from the Hanfmann-Kasanin results that it is important, in applying such tests clinically, to know the pre-psychotic status of the patient. It was discovered that schizophrenics who had had a superior education prior to their illness made an average score of 24.4, while those of average education scored 19.9. Thus, while we might expect that the capacity to think conceptually is the normal thing for human adults, a sort of birthright—so to speak—it is apparent that biological maturity alone is not enough to guarantee it. The experimenters interpret their findings as indicating that “only those adolescents who have had a certain amount of formal schooling develop the conceptual thinking to a degree necessary for the present test.” Findings pertaining to lack of conceptual thinking in primitive peoples, as compared with the civilized ones, show a

* Goldstein, Kasanin, and others, believe that the similarities in the deficits shown by schizophrenics and frontal-lobe cases make the postulation of some primary loss of brain-function in schizophrenia at least a live hypothesis.²¹

good agreement with this assumption * The findings also raise questions for Vigotsky's assumption that conceptual thinking appears around puberty.

Within the schizophrenic group there were wide differences in performance, indicating in part that this diagnostic term embraces widely differing types within its territory and, in part, that the patients represent different stages and degrees of impairment (The gravely deteriorated who could not follow directions and the emotionally disturbed who would either be rendered anxious or would prove to be uncoöperative, suspicious, and so on, had, of necessity, to be excluded from the study.) Of the total group of 62 patients 26 showed definite impairment and performed at or below the lowest level found in the normals. Vigotsky-test performance of 25 of these patients was classified as "indeterminate" since the scores overlapped those of normals with comparable education Eleven of the 62 patients performed at the highest levels, their scores comparing favorably with those of the normal graduate students and research workers. It is possible, it seems, to have an impairment in conceptual thinking without having schizophrenia, and to be schizophrenic without suffering an impairment in conceptual thinking.

An Analysis of Types of Performance

More instructive, for our purposes, is the analysis of the performance of those who failed, and the pointing up of the contrast between their methods and the methods of those who succeeded.

Understanding the task The standard instructions for the Vigotsky test direct the subject to begin his work in this fashion.

"These are four different kinds of blocks Each kind has a name. This kind of block, for instance (turning up a triangular *mur*), is called *mur*. Your task is to find these four kinds and to put them in those four spaces (showing the four corner fields of the board) You might start by picking out all the blocks that you think might belong to this kind, *mur*, and putting them in this space."†

* In another place Kasanin writes: "Luria interested me in the whole subject of conceptual thinking In 1932 he organized a psychological expedition into Central Asia, where there had been a very rapid industrialization of extremely primitive nomadic tribes He showed that, because of their industrialization, there had been a marked advancement of conceptual thinking. We should like to know more about it in our own culture . . ." From the symposium, *Language and Thought in Schizophrenia* (University of California Press, 1944), p 132 Used by permission

† Hanfmann and Kasanin, *Conceptual Thinking in Schizophrenia* (Nervous and Mental Disease Monograph, 1942), p 103 Used by permission.

The superior subjects understood at once that they were confronted with a classification task. They looked upon the *name* as a sign for some trait or aspect or relationship to be abstracted from a row of similars. They examined the *sample* (or *samples*, as successive helps were given) for properties (size, color, shape, height, and the like) and successfully used these abstracted properties as *hypotheses*, unhesitatingly forming groups possessing the common trait, and utilizing *all* of the blocks possessing the trait. The experimenter's *corrections* (like the negative instances in the experiments of Kuo and Heidbreder) were taken, as intended, as evidence that their guesses were not valid; and another hypothesis was then tried. They sensed the arbitrary character of the test, realizing that *any* aspect was a possible one and that they could not possibly know in advance which one was correct, that many possibilities would have to be examined. In short, they took an *experimental* approach. Even their errors were insightful—that is, conceptual in character. When their solutions were reached they could verbalize the principle of classification; and when the experimenter asked them if they could repeat the task and reassemble the classes they greeted the question with laughter! Of course they could! The tests could not be used a second time with such patients for they remembered the principle months afterward.

The failing subjects If they had ever acquired it these subjects seemed to have lost the notion of what the formation of a class of similars involves. The *names* were not used as names but rather as “lettering”—as just another trait like any others. Instead of abstracting an essence and hunting for this trait throughout the series they substituted various faulty procedures. They looked for blocks that would fit the *mur* (a trapezoid, for example with one side equal to the triangle,) forming *constructions*—although these constructions were not made with any plan, in advance, simply growing like the figures of a doodler. Or they formed *chains*: a red circle was joined to a red triangle, and to the circle was added a flat blue circle, and to this a blue trapezoid, and so on. The linking principle changed repeatedly, whatever struck the subject's fancy suggesting the next link. This procedure, of course, provided no terminus or boundary for the class, and sometimes one of these conglomerate groups would absorb all the blocks. Or they would construct a group of *dissimilars*, an equally ambiguous procedure that sometimes represented their reaction to a correction. (“Oh, you want me to put together those blocks that are *not* alike”) Or *families* would be formed in which now this, now that aspect of the *mur* formed the basis of grouping. Or only those blocks almost completely identical were joined, with the result that too many leftovers could not be placed. The failing subjects were also

unable to utilize corrections in any way at all, in some cases. Sometimes they would remove the block when the experimenter indicated that it did not fit (was not a *mur*, for example); but then they would continue with the same procedure. Or they would reject the test as "crazy", insisting that the different *shapes* (with the same names) could not possibly go together. (Here was "Johnny-one-note" with his fixed categories.) A special procedure, mainly confined to the schizophrenics, produced what the experimenters called *physiognomic* groupings. "These go together," the patient would insist "because they are all shiny." And he might add a story about houses, windows, automobiles. "These can't go together," another would insist—keeping a yellow block away from white ones—"because there are no Chinese working in this hospital." Instead of the objective test materials, in this case it is a *projected* quality that forms the basis of linkage. Instead of the task and materials of the test situation, real life and its prejudices have intruded.*

Because of their definition of the task the failing subjects were apt to look upon the performance as merely a guessing game. The *mur*'s had this name printed on the bottom (out of sight) to be sure, but who could tell when one would hit upon a *mur*. Such a task, without rhyme or reason, might be amusing to the tester; but it had no sense. Blind trial and error was all that could be expected.

When the failing subject was finally forced, by the successive turnings of the blocks, into the correct grouping, he sometimes remained without insight. Some subjects did achieve an understanding at this point (most commonly this occurred in the normal subjects of average education). The "hindsight" they now possessed made clear to them the depth of their lack of understanding previously; and some of them went away from the test feeling that they had learned something new. The surprising fact, however, is that so many subjects, unsuccessful up to this point, could not be helped by any amount of additional explanation. The authors comment:

* In another study of schizophrenics the experimenter presented pictures to be classified. The patient placed a group together, saying, "These might come from an English newspaper." In her own fantasies she had been partly responsible, she was sure, for the abdication of the King of England. She was constantly preoccupied with British affairs, relating all sorts of material to this category, and to herself. When the experimenter presented the test pictures to her she did not adjust to the test situation, as such, but continued with her problems. Another subject interpreted the words "go together" in a very concrete way, selecting a picture of a young man and woman as most apt to "go together."

The inability to separate the general hospital situation from the test situation is also shown in a patient's handling of the "ball and the field" test (See Lewis M. Terman, *The Measurement of Intelligence*, Houghton Mifflin Company, 1916, pp. 210 ff.) The patient refused to perform, insisting that he had never lost a ball. Another patient, shown a picture with a boy fishing next to a "No Fishing" sign, was asked "Why shouldn't he fish here?" and responded, "They don't fish here in the hospital; and it is not the time to fish now."²³

"It is, in fact, one of the most striking experiences in giving the test, that one may explain 'the correct' method of solution over and over again, and yet not achieve the desired change in the subject's procedure. Paradoxically speaking, one may say that in this task, as in others requiring purely conceptual thinking, the usually assumed relationship of understanding the task and solving it, is reversed. In order to understand a problem adequately, the subject must be able to solve it, i.e., must be in possession of the mental processes necessary for a logical solution. Speaking more exactly, the interpretation of the task depends on the subject's level of thinking just as much as does his procedure in solving it."*

Finally, when the "correct" grouping had been formed through the "forcing" of the experimenter's promptings and the subject had been brought to verbalize (but not understand) the principle, he responded to the question, "Now do you think you can repeat this grouping?" with an expression of doubt. Without the grasp of the organizing principle the category was simply filled with a heterogeneous assortment of objects and linkages too varied and complex to register. Although he could be made to say the words, the verbalization did not *mean* what it does to the one capable of approaching the problem with an abstract attitude.

Between these two levels there was an intermediate area in which there was a dim sense of the nature of the task and a partial ability to form a group. Pseudo-concepts and collections that involved a certain *rule of procedure* were formed. But his rules are not too rigorous. He seems ready to deviate from the rule whenever some other relationship strikes him as more likely. Or he may attempt one or two classes and then descend to the "game with rules," the trial and error form of procedure, the concrete groupings. Some dim perception of what is expected of him seems to be necessary if the task is to be disturbing to the subject. The patients with brain lesions, who performed at the lowest levels of all, were least disturbed. Occasionally, a subject who appreciated that the problem involved classification would become so upset with the corrections (and the implication—as he sensed it—of his stupidity) that he would seem to lose the categorical attitude. "I don't know why I am putting this one here—this is not a category." "I should think—this is a thinking problem!" "This is becoming trial and error . . . it is silly to look for dissimilarities . . . the most chaotic grouping I ever saw!" Although they began with a clear understanding of the task, these emotional subjects (frequently those who were too ambitious for a good showing, the experimenters thought) concluded the task with a level of performance much like that of the organic cases.

* Hanfmann and Kasanin, *op. cit.*, p. 21. Used by permission.

The presence of emotion, of self-criticism, of tenseness at failure, the authors feel, indicates some glimmer of understanding, only a person following some sort of rule can be "corrected." On the other hand, too great a disturbance, too prolonged frustration, seems to *lower* the level of approach.

The total inability to profit from corrections and to gain an insight into the principle, once the groups were formed before him, was found in but two (4 per cent) of the healthy subjects, 28 per cent of the schizophrenics fell within this category. In the repetition test, again, the patients supplied most of the total failures (40 per cent) as against two (4 per cent of the normals). However, the evidence, as in the study of frontal-lobe cases, again contradicts the simple all-or-none conception. The categorizing attitude is more or less operative. Although a few seem, in the test, to be wholly without it, those who have the capacity use it in varying degrees.

The literature of schizophrenia abounds with instances of pre-logical, concrete forms of speech and behavior outside of such test situations. Bleuler's patient, who felt that his discovery of a thread in his soup indicated the deep bond between him and a Miss Threadway, shows as pre-logical or physiognomic a classification as any made in the Hanfmann-Kasanin tests. It would be easy to conclude that this contamination of thinking, instead of representing an intrusion of repressed materials, is due primarily to a lowering in the level of thinking, a loss in capacity for abstract thought. It should be noted in this connection, however, that some of the Hanfmann-Kasanin patients with fantastic, delusory, and paranoid behavior could perform in the Vigotsky test at the very highest levels. For example, a twenty-seven year old man who had given up his job and had remained in bed for six months, and who heard people talking to him about some of his strange ideas over the radio, seemed to be vaguely entertaining a "mystical" resemblance between himself and Christ. He grew a beard, and between periods of mute posturing let it be known that he was imitating Christ. The test-performance showed no regression from the highest conceptual level *in the use of the Vigotsky materials*. On the other hand, many of the normals, who had very low scores on the test, had no such adjustment-difficulties. This lack of relationship seriously impairs the value of Vigotsky's original hypothesis.

REFERENCES

- 1 Otto Jespersen, *Language Its Nature, Development, and Origin* (Henry Holt & Co., Inc., 1923)
2. Clark L. Hull, "Quantitative Aspects of the Evolution of Concepts," *Psychological Monographs*, 28 (1920), No. 123, pp. 1-86

- 3 H. L. Koch, "The Influence of Mechanical Guidance upon Maze Learning," *Psychological Monographs*, 32 (1923).
4. Hull, *Principles of Behavior* (D. Appleton-Century Company, Inc., 1943).
5. Zing Yang Kuo, "A Behavioristic Experiment on Inductive Inference," *Journal of Experimental Psychology*, 6 (1923), pp 247-293.
6. K. L. Smoke, "An Objective Study of Concept Formation," *Psychological Monographs* 42 (1932), No 191, p 44.
7. E. Jacobson, "Electrophysiology of Mental Activities," *American Journal of Psychology*, 44 (1932), pp 677-694.
—, "Electrical Measurements of Neuromuscular States during Mental Activities. VII. Imagination, Recollection, and Abstract Thinking Involving the Speech Musculature," *American Journal of Physiology*, 97 (1931), pp 200-209
- L. W. Max, "An Experimental Study of the Motor Theory of Consciousness III. Action-Current Responses in Deaf Mutes during Sleep, Sensory Stimulation, and Dreams," *Journal of Comparative Psychology*, 19 (1935), pp. 469-486.
- 8 H. B. Reed, "Factors Influencing the Learning and Retention of Concepts I The Influence of Set," *Journal of Experimental Psychology*, 36 (1946), pp. 71-87
—, "II. The Influence of Length of Series III The Origin of Concepts," *ibid*, pp. 166-179. "IV. The Influence of Complexity of Stimuli," *ibid*, pp 252-261
9. C. K. Ogden and I. A. Richards, *The Meaning of Meaning* (Harcourt, Brace & Co., Inc, 1923), p 77
10. Reed, *op cit*, I, p. 85. Italics added.
- 11 Reed, *op cit*, I, p. 86.
12. Reed, *op cit*, III, p 173
13. "Report No I Shock Therapy," *Psychosomatic Medicine*, 10 (1948), pp 55-56.
- 14 James L. Graham, "Learning to Generalize," *Psychological Monographs*, 50 (1938), pp 84-115.
—, "An Experiment in Generalizing A Unicursal Problem," *Journal of Experimental Psychology*, 23 (1938), pp. 96-101.
- W. W. Ball and H. S. M. Coxeter, *Mathematical Recreations and Essays* (The Macmillan Company, 1947).
- 15 Graham. "An Experiment in Generalizing," *ibid*, p 100
- 16 R. M. Brickner, *The Intellectual Functions of the Frontal Lobes* (The Macmillan Company, 1936).
- 17 Kurt Goldstein and Siegfried Katz, "The Psychopathology of Pick's Disease," *Archives of Neurology and Psychiatry*, 38 (1937), pp. 473-490.
- 18 S. C. Kohs, *Intelligence Measurement* (The Macmillan Company, 1923)
19. A. B. Nadel, "A Qualitative Analysis of Behavior Following Cerebral Lesions," *Archives of Psychology* (1938), No. 224, pp 1-60
- 20 Ward Halstead, *Brain and Intelligence* (University of Chicago Press, 1947)
21. Goldstein, "Methodological Approach to the Study of Schizophrenic Thought Disorder," in J. S. Kasanin (ed.), *Language and Thought in Schizophrenia* (University of California Press, 1944), p 37
- L. Vigotsky, "Thought in Schizophrenia," *Archives of Neurology and Psychiatry*, 31 (1934), pp 1063-1077.
—, "Thought and Speech," *Psychiatry*, 2 (1939), pp 29-40
22. Eugenia Hanfmann and Jacob Kasanin, *Conceptual Thinking in Schizophrenia* (Nervous and Mental Disease Monograph, 1942)
- 23 Hanfmann, "Analysis of the Thinking Disorder in a Case of Schizophrenia," *Archives of Neurology and Psychiatry*, 41 (1939), pp 568-579.

CHAPTER 17

Reflections on the Nature of Everyday Thinking

When we leave the laboratory and the clinic and turn to the thinking and reasoning of the man-on-the-street, when we watch the operation of thought-models as they are forced to bear the freight of our strongest hopes and fears, what do we find?

COMPLEXITY

The materials dealt with in our everyday problems are more complex than the neat geometrical figures constructed according to a principle, or the Chinese characters with identifying radical. The boundaries of our everyday categories are unclear and arbitrary, the objects we meet are indeed “well-springs of properties” which permit multiple classifications. A is not-A; and it is also B, C, D, and X. And our everyday purposes—which have everything to do with our categorizing—are both mixed and serious. We are not relatively aloof spectators, as in the laboratory or study, we are combatants, lovers, anxious ones engaged in meeting vital issues. And as our purposes and needs are mixed (and, in part, unknown to us) the objects have, of necessity, a confusing quality.

Thus, even for many adults, the world remains a buzzing, blooming, confusion. Its objects, moreover, come to us in ever-varying contexts, embedded in a wealth of details which often confuse and prejudice us. Although these details are *in fact* irrelevant to our real problems, they are not without power to influence our decisions. The candidate for the new position may have a careless hair-do, or a pimply skin, or a resemblance to Adolf Hitler, none

of which characteristics—our sober judgment might tell us—has the slightest bearing upon the candidate's professional competence. Yet the mere presence of such traits adds a "non-logical halo" to the object, affecting our judgments, decisions, and the course of our thoughts. The wide divergence that appears when candidates are interviewed and rated by supposedly competent judges working under the best conditions they can devise, indicates that this task of classifying human beings is beyond our unaided powers.*

The richness of details, the multi-faceted character of our real dilemmas, surpasses our powers of perception, and even more our powers of verbalization and symbolizing. We seldom achieve full description and analysis of our problems, and our thinking, in consequence, starts from vaguely or incorrectly conceived definitions, and proceeds with many essential and significant items lost. Where we are not un-conscious, un-thinking (and much of human behavior belongs here,) we are sometimes falsely conscious. The framework of our thought, our model of reality, is then like a sieve through which the essence has escaped.

And since the situations we face are not the simple six-sided figures, the black and white drawings, but interpersonal settings in which highly motivated persons meet head-on, we often "emote," "thob," "feel," and act impulsively. We have neither the time, the inclination, nor the wit to "pause and consider." In the most critical issues of life we could not achieve certainty, given unlimited time; and since the prizes are won by those who make prompt and effective action, we are willing to let the *other one* think. As for ourselves, as men of action, we prefer to *create* the reality which others can then reflect upon. Distrust and doubt win no prizes; neither do they inspire affection and loyalty.

In this sense the principle of Reason is counter to Life. There are two main classes of motivating conditions which drive us to think. We are uncertain and fearful, and we are guilty. We hesitate to release the impulse lest its consequences, which we do not fully know, bring pain in their train. And we hesitate to act before our peers lest they detect the selfish, aggressive, or lustful components in our makeup. Two protective glosses are required, therefore, when we release any act. And if we must be certain and perfect before we act, then most of the vital issues must be postponed; and we shall be, indeed, "sicklied o'er with the pale cast of thought." If, at each choice

* When a candidate is listed as the best (in a group of 50) by one of a dozen raters, and as the poorest by a second rater, we can see at once that the candidate is a measure of the raters as well as being rated himself. Equally disillusioning facts about very carefully devised rating schemes appear in Murray's *Explorations in Personality* and in the wartime studies of the Office of Strategic Services.¹

point, we followed the pattern of Heidebreder's subjects who resorted to "spectator behavior," and if we turned to the building and testing of conceptual models for each act, then we would live out our days in hesitation and uncertainty. Quibbling, experimenting, classifying, we would remain one step removed from the final reinforcements which alone support and nourish Life.

Few of us fall into this pattern, and even then for only a portion of the time. If we try to imagine our fellow human beings ranged along a dimension—at one end of which is the impulsive person who suppresses thought, rejects doubts, frets against every need to deliberate, cuts the Gordian knot of his perplexities with the blow of action, while at the other end we place our hesitant hair-splitters—we would also imagine a rather heavy concentration of cases at the impulsive end. It is a believing and acting world. We are actors, in fact, long before reason, caution, and the categories have emerged, and we have many bread-and-butter habits that work fairly well.

In so far as these observations are true—and they are a judgment, unproven—Newman was right when he described Faith as the principle of action, the prevailing attitude of the average man.

"Diligent collection of evidence, sifting of arguments, and balancing of rival testimonies, may be suited to persons who have leisure and opportunity to act when and how they will, they are not suited to the multitude. Faith, then, as being a principle for the multitude and for conduct, is influenced more by . . . previously-entertained principles, views, and wishes"*.

VERBALIZATION

Psychologists are prone to verbalize, and in their efforts to pull out and make explicit the internal processes we call thinking they lay traps which prompt their subjects to do likewise. Not all of us have the words for our hunches and feelings, nor do we always trouble to use the words we have. We do not need to, any more than we need to look back of the mirror when we see the image, as we once did in childhood. Through the bulk of our acts we move with little more than a complex aura of unanalyzed feelings and anticipations. We dismiss the article as "bosh," reject the painting as "tripe." We *feel* the impending consequences of a projected action but do not explicitly formulate them. Inhibitions and facilitations operate so quickly that action is over before we stop to think. The purposes of life are not to

* John Henry Newman, *Sermons and Discourses*, Vol. I, p. 315 (Longmans, Green & Co., Inc., 1949). Used by permission.

write an extended protocol. The grammatical and chatty verbalizations of the report of the experimental study are condensed, in the living situation, until they are little more than a shrug of the shoulders, a shift in the line of attack. If questioned, we may be able to produce an "explanation." But these explanations can never name all that went on. An experimental science is required to arrive at even an approximation of such in-between processes, and the experimental situation emphasizes and amplifies, artificially, what is abbreviated in the world of action. Such a science, like art, is long. Life, itself, is short and calls for action and enjoyment, not words. We are not as wordy as the laboratory would make us seem, nor as thoughtful.

AWARENESS

The determining factors in our everyday thinking are also frequently unconscious. In this respect, Hull's technique, which did not forewarn the subjects to verbalize, to compare, to search for unifying concepts, is closer to the prevailing state of affairs. His subjects developed functional concepts, often without being able to explain the bases of their discriminations. And so it is in life.

In addition to the conditions of everyday thinking that we have stressed, there are also those reasons for our actions of which we prefer not to speak, those motivations we fear to admit, or are ashamed of. To the degree that we succeed in placing these conditions out of mind, not only the goals of our thinking but the definitions of our problem function beneath the level of awareness.

In this circumstance we arrive at solutions but have no intervening thoughts. the "in-between" events, the stages, are missing. If these in-between events are to be assumed to function at all, they function in some behavioral stream, some sequence of unconscious and unreportable events. The swing of the galvanometer in the free-association test, the concentration of themes in the Thematic Apperception Test, the performance of the subject under post-hypnotic suggestion, and the findings of psychoanalysis, have convinced many psychologists that there are such "unconscious thoughts." Since they are not open to direct introspection, since they are *inferred* processes, these unconscious events are logically on a par with the inferred subatomic structures of the physicists. They are scientific constructs which serve to unify diverse observations. They are a part of the psychologist's thought-model, though they do not enter the awareness of the thinker, himself.

The laboratory situations used in the experimental study of thinking are much less apt to involve such causes for repression. This fact, together with the constant pressure for verbalization, makes the laboratory picture of thought appear more wordy, more conscious, than it is in everyday life.

RATIONALIZATION

The drift of our argument, the emphasis upon automatic rather than consciously planned action, upon hindsight rather than foresight, upon highly motivated and conflict-laden courses of action rather than upon the calm, judicious, conceptual thinking of the spectator, should make it clear why so much of human thinking deserves to be called *rationalization* rather than reasoning.

Rationalization is *post-mortem* thinking. After we have acted, impulsively, habitually, from a background of causes too complex to understand (and sometimes too unpleasant to admit) we then, *after the fact*, give the gloss of reason to our acts. *Had we stopped to reason*, the considerations we now name might have come to our minds (Occasionally, indeed, we catch ourselves anticipating criticism, preparing our rationalizations in advance) The fact is, these reasons did not occur to us. Is it not surprising, under these circumstances, that we succeed almost universally in finding good and sufficient reasons for our behavior?

Rationalization is *self-defensive*. In fact it is our questioners, the critical glances of the members of our clique, and especially the criticisms of those opposed to us, that call out our rationalizing. If we were not social creatures, if we did not need their approval, if no one opposed or criticized us, we should not bother—or if each of us were so perfectly socialized that our acts spontaneously conformed to the mores. Objectively we are deviants; and objectively we do compete with one another. And if we are to get on with our fellows we need a gloss for our acts. The very values of our culture demand it. Perhaps all good *Zufü* do not need it; but the one who wins the foot-race three times running, and the one who aspires to be a leader of the people, stand in need of some good way of rationalizing their conduct. Rationalization requires that we cover the naked multiple causation of our acts with the cloak of Reason and Virtue. The virtues are few in number, the motives of human behavior numberless. Rationalizations are monotonous, simple; a rational account of our acts far too complex, and possibly painful, shameful.

Rationalization is, therefore, a *simplified thought-model*. When individ-

uals or parties, having developed such prettified and simplified models in self-defense, are finally "taken in" by their own rationalizations to the point where they proceed to think with these schemata, we say that they have lost insight. They do not see themselves objectively (that is to say as we, and the recording angel, see them). The myth of democracy is a valuable datum for the social scientist; but it is a poor substitute for sociology, or political science. Similarly, John Doe's image of himself is a valuable psychological construct (though to infer it from his behavior proves very difficult), but it is not a complete picture of John Doe. In his own eyes John is undoubtedly the Great Lover, the Man's Man, the Sincere Friend, the Good Provider, the Honest Citizen. When he gives a rational gloss to his conduct before his quizzical friends he uses this model and these categories; and he also adds new brush strokes to the image which he, himself, will later use.

Rationalization is *authoritarian*, in that it appeals to the Idols of the Tribe, the beliefs of all right-thinking men. Its syllogisms are seldom explicitly formulated; but the three propositions of classical logic are implicitly there. Why do I vote against socialized medicine? Because I am against the Welfare State!

All welfare states weaken the moral fiber of their citizens.

A state that embarks upon a program of socialized medicine becomes, *ipso facto*, a welfare state.

A state that provides socialized medicine weakens the moral fiber of its citizens.

And I, John Doe, am wholeheartedly for moral fiber!

Much rationalization can be reduced to simple *name-calling*. We justify our aggressions by classifying our opponents with those who are beyond the pale; and these bludgeon words are enough to stop thought, frequently. All the fallacies of classical logic are committed in the name of rationalization.

The Communists opposed Chiang Kai-Chek.

Senator X . . . opposed Chiang Kai-Chek.

Therefore, Senator X . . . is a Communist.

Or:

General Franco fought the Communists.

The democracies are opposed to Communists.

Therefore General Franco's government is a democracy.

The rules of logic are devices carefully designed to check the processes we have been considering. Although a double abstraction has occurred by the

time we arrive at the ordered syllogism the terms and categories are still contaminated with strong motivations. Experimental studies have shown that subjects make fewer errors in logic when the familiar words are replaced by the letters A, B, and C. Although weather-wise as to the syllogistic traps, the contaminating force of bludgeon words, emotionally toned categories, bends the structure of the thought-model, warps judgment. The biases of wish and fear, and the bonds of habit, tend to continue their force within the thought-model.

For all of its power to correct and limit our biases, logic can never guarantee more than the logical correctness of a conclusion. It is like a faultless adding machine: if the correct buttons are punched, and if adding is the proper operation, the total may be trusted. What we do not put into our thought-model, correctly, the machinery of logic itself will never reveal. Thus, for all of its coercive power, the logically correct system always has feet of clay. The categories, the basic assumptions or postulates, the primary formulation of propositions and relationships, are psychological rather than logical. These basic postulates represent a *possible* view of things, not a necessary one. They are often presented as axiomatic, as mere summaries of experience shared by all men who possess Right Reason. But these addenda are an appeal to the gallery, not a proof, and they never can guarantee that the postulates are the best ones for the practical purposes of the reasoner, or that they correspond to anything beyond the consent of the validating audience. The addenda are easily recognized as rationalizations.

As postulates lead to theorems and corollaries; and as implications—worked out on the model—are tested by actions in the practical world, the thought-model grows in complexity and coercive power. Every difficult problem is worked out via the model, and every added experimental finding is incorporated into its structure. But with all of its successes the model can never guarantee the correctness of any answer; nor can it guarantee that it contains representations of the precise variables that are important for tomorrow's problem. Nor can it guarantee that tomorrow's reasoners will put their problem into model-form correctly, that they will manipulate the model correctly, that the results will be interpreted and re-applied to practical affairs without error.

Models are built by men. They can have no more coercive power than the primary observations that formed the categories and established the main lines in the architecture of the system. Should the model builders fail to see a significant object, fact, or relation, even a logic-tight model would grind out warped conclusions only. Whoever should act upon its answers would repeatedly stub his toe against the omitted fact. Should the model builder

lack vision his model would not itself remind him of his blindness. Should he repress a fact because of its painful nature, the model would not tell him that he had done so.

Through the practical gains it accomplishes, through the prestige the model-specialist enjoys, through the power of the consensus—the social support for the model-builder's view—and through the inertia of habit, the model gains more and more force over the minds of men. The shape of things we have been taught becomes the only possible shape. What puts a strain upon the model becomes a strain upon credulity. What is left out of our word-model of the human being becomes contrary to human nature. And what violates the conclusions ground out by the model is counter to Reason. Science becomes the Grand Rationalization; and we come to revere a theory in a way that should be reserved for Theory.

To consistently use a thought-model is a discipline, a discipline that is not without its dangers. In accepting any given model we accept its answers; and a model can *make* important issues insoluble. Sharpening the mathematical precision of his tests did not make Hitler's psychologist produce leaders who were fit to lead the German people toward humanly desirable goals. Psychotechnics alone, however logical the conceptual system, can not produce a good society.

The limitations inherent in the rationalizing process are easily spotted. At least we recognize the propaganda and rationalizations of *those others* for what it is. We have a low opinion of *their* powers of reasoning. We detect the apologetic, defensive, hypocritical, disarming, blustering qualities in *their* arguments, discounting them for what they are. We begin to wonder why anyone should rationalize at all, when it is so transparent. Yet we cling to the belief that our own reasoning is superior. And often we are *positive* that we are right (in the high voice). Why are *others* so illogical? We can even spot the errors in their basic premises. No wonder the old judge advised his young successor, "Give your decisions. Never give your reasons. The decisions will be just, the reasons incorrect."

CONTROVERSIAL ISSUES

All of the principles we have discussed are illustrated in the public records of thinking on controversial issues. My race, my religion, my political party—in fact all of those groups, ideas, persons toward whom I feel a deep sense of identification and commitment—serve to anchor my thinking in premises that lie deeper than words. Here I take my stand.

Wherever racial segregation has developed its way of life, implicit premises become a basis for thinking on ethics and politics. The "superior" caste, meeting the challenge of "inferiors" who have grown bold and restless, reaches for its gun. If it also resorts to arguments it will be to find "facts" that merely bear out what, at basis, needs no demonstration; and biology, anthropology, and Holy Writ will be called upon, if at all, to support "what any intelligent man can see with his own eyes."

The inferior caste on its part can quote "We hold these truths to be self-evident . . ."; and it will feel *positive* that any ethical or political system that overlooks the patent fact that "all men are created equal" must remain beneath contempt.

The arguments arising at these points of controversy take on a bludgeon character, striving to beat down an opponent by sheer power of emotionally loaded words, or they grow subtle, probing the weak points in an opponent's armor, flattering his prejudices, concentrating upon the opponent rather than upon the facts at issue. Though each side marshals its "facts" it is apparent that some "facts" are more coercive than others.

The heart has reasons, Pascal reminded us long ago. Motivated, striving, contending human beings, loving, hating, defending a way of life, meet at the barricades. As the intensity of the conflict rises, threatening the very lives of the contenders, the level of reasonableness declines, and with it the willingness to appeal to facts, to experiment. If the Communist frankly strikes for the sources of power and then, when in control, ruthlessly suppresses every dissenting voice, his enemies also proceed with measures calculated to frustrate these acts. And in so far as the course is one of appealing to force (and the bludgeon type of argument) reason has fled.

Whether we deal with the propagation of the faith, the institution of new procedures in an organized group, the defense of a caste or class that holds power, non-logical motivations commonly lie beneath the surface rationalizations that pass for argument. Where we cannot or will not experiment, our wishes and fears, loves and hates, supplant the reality principle; and reason is replaced by propaganda, thinking by "thobbing."

EXPERIENCE-DETERMINED THINKING

Everyday thinking is closely tied with the rest of life's experience. The solution of the problem in the artificial laboratory situation strikes us as highly arbitrary and relatively meaningless; it gives the subject little opportunity to draw upon his experience. The materials force the subjects to

"start from scratch," with a minimum of direction. The problems are so constructed that subjects cannot fall back upon habits; and the situations are as novel as can be devised.

Two marked trends arise from this fact. (1) The pressures toward conventionalization from authority, prestige, ritual, are lacking. There are few sanctions, taboos, standards, operative in this laboratory setting. In being freed from these controls the subjects show variable behavior and consider solutions on their own merits. In everyday experience we do much more cliché-thinking: a stitch in time saves nine, the rose is the queen of the garden, honesty is the best policy, might never makes right, and so on. (2) Whereas the solution to the laboratory problem is so wholly novel and so completely unknown, and whereas its materials are not the familiar concrete objects of everyday experience, the everyday situation finds us with our direction firmly set in a field of familiar objects. We are forced to do our thinking because we strike a barrier in the midst of half-finished tasks, and we search for a bridge to close a gap. This "set toward a solution" provides both a limiting frame to bind our thinking and a selective force that transforms and reorganizes the objects in the perceptual field and regulates our recall of the past. The definitions of our tasks both facilitate and inhibit recall; they facilitate the "similar" and they also lead us to neglect other possible experiences (simply because the latter *belong* to situations that have had a totally different definition and structure). This gives a *concreteness* to our everyday thought. The "abstractions" in our everyday thinking are in terms of whole blocks of experience, taken over *in toto*. When the Southern Democrats withdraw from the national convention of the party (as they did in 1948) other elements of the party speak of "secession" and accuse them of "fighting the Civil War all over again." We see our friends as Uriah Heeps, Little Napoleons, Arrowsmiths, Pasteurs. We understand the virtues through the lives of the saints and holy men. We try to fit analogies, metaphors, to the present scene. Instead of pressing our analysis to a deeper level we tend to take the situation as a whole, thinking with total blocks of experience. We speak in parables and reason with crude analogies, neglecting the fact that each new situation is a situation-with-a-difference.

Such reasoning, from the standpoint of the scientist, is primitive. A convention is not the Civil War, our friend is not Uriah Heep. And when the analogy is touched off by some superficial aspect of the present problematic situation the thinking is not apt to be particularly fruitful. As surely as the stereotype fails to fit the reality before us, our actions will be cluttered up by tendencies belonging more properly to the past.

In its concreteness our everyday thinking tends to be indiscriminating.

It resembles the naive and uncorrected generalizations characteristic of the early phases of discrimination training. Like the thinking of the expert it is experience-determined, but the experience that determines the course of everyday thought is an unanalyzed and undigested whole, used unreflectively without analysis and reorganization. Even where the life-experience of an individual has been rich and varied, the concreteness of his thinking often gives evidence that few concepts have been learned. His conversation may be delightful, his analogies amusing, his I-knew-a-man-once stories—suggested by some present problem—interesting even when irrelevant.

Human conversation and thinking are full of such anecdotal material. The discovery and use of high-power abstractions is relatively uncommon, and it requires a discipline and training. Only in the long view, as we think of the evolution of language do we sense the clear and steady trend from the concrete to the abstract. And we can see a parallel development in the life of the individual as we compare the gross differences between child and adult. The child's first words are situation-words, a single syllable in a matrix of gesture is made to stand for numerous propositions and commands. Our adjectives begin as evocations of concrete objects. We describe a glance as stony, a chubby person as moon-faced, and we speak of iron wills, velvet skins, razor-edged wit. From one whole to another whole, the mind of the perceiver leaps even before he has analyzed out that essence which forms the proper bridge to a class of objects.

This primitive and metaphorical type of linkage between objects and situations may be characterized as pre-conceptual, pre-logical. It provides the row of similars, the raw stuff out of which concepts are fashioned. Without this primitive flight from shape to similar shape, the attentive thinker would not have the materials for comparison and contrast, for that to and fro movement which produces the shock of difference and the "aha-moment" when essential likenesses are seized upon.

Such similars, evoked *before* the essence has been seized upon, should be classed with that kind of generalization which arises in the first phase of conditioning. The power of the unconditioned stimulus spreads, and too widely. The chick, sampling the cinnabar caterpillar, rejects this object and wipes his bill; and is thereafter disillusioned about caterpillars-in-general. Even the not-too-similar worm may induce the bill-wiping. As conditioning proceeds, discriminations arise, and reactions begin to conform to specific differential cues. Boundaries are established.

Beyond the primitive and metaphorically similar, the reasoner must press until the essence emerges. Once it is grasped an immediate difference in reaction-potentialities follows: (1) A broader class can be formed; and

(2) the class of similars is sharply limited. The similarities that were concealed in embedding matrices can be isolated and used with much greater ease (though not perfectly). And on the other hand the class is limited to the group bearing specific configurational properties: the nasty-caterpillar class is limited to specific shapes and colors; the dog-to-be-feared is the brown-chow-at-the-corner and not the friendly pups on the street. Between the primitive generalization and the sharply defined class there are many gradations and degrees. Insight is not an all-or-none process, but a series of progressive differentiations.

If we outline three levels in the development of thought, therefore, these rough categories must be taken as a simplified model for a reality that contains an infinite series of gradations. At the first level our associations are between concrete wholes. Perhaps the most primitive of all classes is based upon simple contiguity, simple functional togetherness. *This* makes us think of *that* because it has always accompanied *that*. Pipe suggests matches and tobacco, apple pie suggests cheese. Use and wont make this category. Next comes the class of similars where the shape of a dynamic whole arouses another whole. Here the bounds of contiguity in time and space are broken, and fields remotely placed become contiguous in thought. Sunsets suggest heroes deaths, and the musk-like odor of a dead-dog-at-a-distance suggests Lord. . . . Then the work of comparing and contrasting, the to and fro movement which abstracts the essence, leads to the emergence and identification of the concept. Precisely grasped and defined this essence now links together the members of a class—suddenly broader than the metaphorical group, but also excluding some of the original similars, now that the borders of a territory have been defined.

In the course of our development as reasoners, we progress through each of these levels until finally, aware of the nature of our progress and of the usefulness of our categories, we consciously seek them. Some of us become specialists in this task, directing our energies in the paths of scientific research, or linking conceptual systems into an ordered system of metaphysics, criticizing, comparing, and laying bare the most basic of our assumptions, seeking the most basic essences. One vivid example portrays an early stage in this progress of our awareness. The teacher of Helen Keller describes the moment when her pupil first became aware that every object had a name and that this name could be applied to a whole class of similars:

"I must write you a line this morning because something very important has happened. Helen has taken the second great step in her education. She

has learned that *everything has a name, and that the manual alphabet is the key to everything she wants to know . . .*

"This morning, while she was washing, she wanted to know the name for 'water.' When she wants to know the name of anything, she points to it and pats my hand. I spelled 'w-a-t-e-r' and thought no more about it until after breakfast . . . (Later on) we went out to the pump house, and I made Helen hold her mug under the spout while I pumped. As the cold water gushed forth, filling the mug, I spelled 'w-a-t-e-r' in Helen's free hand. The word coming so close upon the sensation of cold water rushing over her hand seemed to startle her. She dropped the mug and stood as one transfixed. A new light came into her face. She spelled 'water' several times. Then she dropped on the ground and asked for its name and pointed to the pump and the trellis and suddenly turned round she asked for my name. I spelled 'teacher.' All the way back to the house she was highly excited, and learned the name of every object she touched, so that in a few hours she had added thirty new words to her vocabulary. The next morning, she got up like a radiant fairy. She has flitted from object to object, asking the name of everything and kissing me for very gladness. . . . Everything must have a name now . . ."*

Dr. Cassirer, commenting on the illustration, asks:

"What was the child's real discovery at this moment? Helen Keller had previously learned to combine a certain thing or event with a certain sign of the manual alphabet. A fixed association had been established between these things and certain tactile impressions. But a series of such associations, even if they are repeated and amplified, still does not imply an understanding of what human speech is and means. In order to arrive at such an understanding the child had to make a new and much more significant discovery. It had to understand that *everything has a name*—that the symbolic function is not restricted to particular cases but is a principle of *universal* applicability which encompasses the whole field of human thought. In the case of Helen Keller this discovery came as a sudden shock. She was a girl seven years of age who, with the exception of defects in the use of certain sense organs, was in an excellent state of health and possessed of a highly developed mind. By the neglect of her education she had been very much retarded. Then, suddenly, the crucial development takes place. It works like an intellectual revolution. The child begins to see the world in a new light.

* Helen Keller, *The Story of My Life* (Doubleday, Page & Co., 1903), pp 315-316. Used by permission of Doubleday & Company, Inc.

It has learned the use of words not merely as mechanical signs or signals but as an entirely new instrument of thought . . .”*

Thus, in the development of the reasoner, the world is first full of a number of things, quite discrete, poorly linked together. Like puddles in the roadway after a storm, the separate existences have a life of their own; there is no flowing together. Primitive generalization, metaphorical leaps and hunches begin the process. Occasionally there will occur, as it did to Helen, one of those anticipatory questions (as when she first asked her teacher for the name of water). But the linkages are sporadic, uncertain, contradictory, inconsistent. Yet when the concept of signification is grasped, the class of similars expands indefinitely. Everything has to be named.

So it is when at a higher stage a concept of concepts is formed. Conceptual thinking becomes *de rigueur*. Mere empirical thinking will not do. To be caught without a conceptual framework is to be mentally undressed, and the sophisticated search for concepts is on. We refuse to rest content with a mere historical account of some unique situation. What *really* happened? And that calls for a theory, a selection of the essence out of the welter of particulars, an understanding of the dynamics of the event which would at once link it up with hundreds of other well-understood events. No mere gossiping retailing of interesting details—that is, if we are conceptually minded. The historian moves from the position of artist-raconteur to the theorist with a conceptual system for social movements. (And we may as well admit it, often with sad results.)

Somewhere on this path of development of reasoning lies the systematic ordering of concepts into the various sciences, and beyond that the classification and ordering of all our concepts into a philosophical system. This ambitious quest may carry us even to that search for the “class of all classes.” Certainly it carries us beyond those limits where we can test and verify—save as our lives and the life of our culture can be said to provide the test. Carried away by our enthusiasm, and impressed with the power of our concepts (witness those science has developed) we may even come to look upon the assumptions, postulates, and rules we have constructed as THE one possible system, forgetting that it is a thought-model, a human construction, and therefore fallible.

This task of ordering and conceptualizing the world is in a very incomplete and unsatisfactory stage, at best. The scientific conceptions, so new, relatively, in human history, so bright and shiny, so sharp and powerful, do

* Ernst Cassirer, *An Essay on Man* (Yale University Press, 1944), pp. 34-35. Used by permission.

butcher the common sense view of things unmercifully. When we began to apply the concepts of physics to our fellowman, describing him as "a complex physical object moving through a world of physical energies,"² or when we sought to reduce human motives to the homeostatic process of restoring the chemical balance in the internal milieu, we did such violence to common sense notions and values that, in spite of the powers we gained, a mood of anti-scientific revulsion affected many of us. We find it hard to revere a great man and at the same time consider him as *merely* a complex physical object forced to move in his orbit by the mechanically operating sum of forces in his field. We find it difficult to be seriously concerned about human goals and at the same time look upon all motivation as on a par with the striving to restore the balance of sodium, calcium, oxygen, and so forth, in the internal milieu. None of us would allow himself to fall in love with a purely mechanical sweetheart, even though her motions were cleverly contrived to conform to those same trajectories followed by human ballistic responses. And the moods of reverence, high seriousness, and love, are *proper* moods for human beings to feel! If, to extend the conceptual network of science means to lose these "values," then we are ready to join with the Turkish *cadi* who admonished his English friend. His inquisitive friend (who was in reality seeking to validate certain sociological concepts) showed, he thought, an unnatural curiosity in requesting statistical information:

"Listen, O my son! There is no wisdom equal unto the belief in God! . . . I praise God that I seek not that which I require not. Thou art learned in the things I care not for; and as for that which thou has seen, I spit upon it. Will much knowledge create thee a double belly, or wilt thou seek Paradise with thine eyes?"*

So there has repeatedly arisen an expression of hatred for all scientific, conceptual, rational, forms of thought. Now it takes the form of praise for the poetical, metaphorical, more primitive form of feeling (rather than conceptualizing) one's way into life. Now it is an essay (like Krutch's) on the modern temper.³ Now it is a move to restore the humanities to their *rightful* place in our education. Or it may take the form of a strong advocacy of a return to a more religious outlook on life.

When, therefore, we find that everyday thinking is full of "thobbing," of emoting, and that much of it is concrete and non-conceptual, let us remember that this is a human predicament, that we are all of us beginners in the

* Quoted by William James in his *Principles of Psychology*, Vol II, pp. 640-641 (Henry Holt & Co., Inc., 1890).

School of Reason The conceptual nets we would now throw over reality are flimsy affairs, and there are huge rents, which let the big fish through. It is a grave error to be contemptuous of all thinking save that which is rigorously conceptual, as grave as the refusal to act save where experiment has validated our decisions. And it is an equally grave error to refuse to use the concepts and the evidence we now have. Reality is undoubtedly wider and deeper than any conceptual account of it now extant. There is ample room for the poets and philosophers who feel harmonies too subtle to state explicitly. Proud though he is to have become the measurer of things, man still needs constantly to remember that his measures are not reality itself. Nature herself is a more turbulent and unpredictable mystery than any of our concepts of her recurrent phases reveal. We have caught certain regularities and uniformities. In so far as she is revealed in these we have gained new powers of foresight and control. But there is more. . . .

ANTI-CONCEPTUALISM IN PSYCHOLOGY

This sense of the "plus-something," which conceptual thinking of necessity sloughs off, is a characteristic emphasis found in many contemporary writers on psychology, particularly in those who have been influenced by the Gestalt school. In fact, when these writers describe our everyday thinking it is our chronic and almost pathological conceptualizing that they attack as the factor that most degrades human reason. This is the theme pressed by Kurt Lewin in his contrast between Aristotelian and Gallilean modes of thought. This is the theme of the semanticists such as Korzybski, Hayakawa, Johnson.⁴

The argument, most briefly stated, runs something like this: We have founded our thinking upon a false premise. We have proceeded as though the world were an eternal recurrence, as though it were cut up into neat categories and classes, as though *this* event were merely another one of *that kind* of happening. The truth of the matter is quite different. The world is in constant flux. It moves and grows. *This* is no more like *that* "than I to Hercules." Heraclitus was right—we never step into the same stream twice.

When, therefore, we allow our inertia, our laziness, or our mechanisms to act as though our lives (and the world) were one eternal round of recurrences we miss the very essence of things. We squeeze out of the passing moment all the rich juices of uniqueness by the very way we conceive reality, and all we have left is the pulp of the past. We neither see nor understand. We "rubricize" every event and person (to borrow Maslow's phrase)

under the old familiar categories. Every new political conflict is simply another one of the monotonous phases of "the class struggle." The primrose by the river's brim is "just a posy." The man who puts the milk bottles on our doorstep is "just the milkman"; and the merchant who sells us our clothing is "just a Jew."

So long as our thinking (if, indeed, this is the word for it) is of this type it acts as a screen between us and the fresh, unique, and living reality. "Rubricizing" really saves us from the pain or effort of thinking, or knowing. And as a kind of inertia principle it anchors us in the past, prevents our growth. Thus one might look at the growth of habit as the beginning of decay of the spirit, the hardening of an outer shell around a too sensitive (or lazy) ego. Faced by pupils who have already formed such habits the artist-teacher feels frustrated when he tries to teach them to draw what is *there*; for they cannot see *it*. Instead they see the rubric, the class-object, the recurrent thing. *This* object seems not to be before them. If we see, as through a glass, darkly, it is because of this deadly inertia of habit. A pathological rubricizing has made us insensitive, dull. We are robots, not thinkers.

True thinking, the argument runs, grasps the uniqueness of the present event. Here and now before us, if we will but submit to it and trouble to really sense it, there is a set of inherent relations, a new interdependence. This milkman is a milkman-with-a-difference. "What makes him tick" can never be read from any well-categorized set of "Laws of the Vocations." No other life is made up of the same combinations of press and need. No other person has lived through precisely the same historical sequence of events. No other person is placed in a field of interacting personalities identical with the field of this one. So let us patiently try to weave the web of a schema to fit *this* one. No lay figure will do for us. For Hollywood, perhaps; but not for us. The human being is One. This is a different type of concept.

When we have finished weaving our unique schema we shall have produced a work of art, a story, a poem, a biography. The milkman-handle with which we first tried to grasp this event will have retreated into the background as an insignificant element. And we shall have faced up to certain almost overwhelming difficulties. In the first place we shall know the limits of our understanding. With all our exploration there will remain something ineffable. The milkman does not even understand himself. How can we? In the second place, because this dynamic "here and now" is so unique, it will be extremely difficult to find the precise words with which to communicate our limited understanding to others. Every word we use is a rubric for a class, and since *this* is unique, every analogy is a poor fit. If a rough sort of

communication emerges from the *pattern* of images we make, it will be surprising; for it will be because the *form*, the shape, the constellation of our efforts contains a power to evoke in-between processes in our hearers, something that is more and other than the images taken singly. The artist's composition is the phi-phenomenon par excellence.

So the argument runs. When we ask the practical question, "What is to be done about it," the answers are not too clear. If the bane of our thinking is the abstracting-rubricizing tendency, how shall we stop it? Back of this tendency lies the purpose of the perceiver, the problem-set, and all his past habits and experiences. How shall we get him to abandon all experience and see, not with one purpose, but with all possible purposes—that is, *sub specie aeternitatis*? Or, how shall we "become as little children" and recapture the freshness of experience that is theirs?

By becoming like poets and artists, we are told

"The full subjective richness of an experience seems to come more often to artistically and emotionally sensitive people than to theorizers and intellectuals. It may even be that the so-called 'mystic experience' is the perfect and extreme expression of this sort of full appreciation of *all* the characteristics of the particular phenomenon."*

By a new type of education

"... we neglect to strengthen habits of concrete appreciation of the individual facts in their full interplay of emergent values, and we merely emphasize abstract formulations which ignore this aspect of the interplay of diverse values ...

"At present our education combines a thorough study of a few abstractions, with a slighter study of a larger number of abstractions. We are too exclusively bookish in our scholastic routine. The general training should aim at eliciting our concrete apprehensions, and should satisfy the itch of youth to be doing something. There should be some analysis even here, but only just enough to illustrate the ways of thinking in diverse spheres. In the Garden of Eden Adam saw the animals before he named them: in the traditional system, children named the animals before they saw them ...

"This professional training can only touch one side of education. Its centre of gravity lies in the intellect, and its chief tool is the printed book. The centre of gravity of the other side of training should lie in intuition

* A. H. Maslow, "Cognition of the Particular and the Generic," *Psychological Review*, 55 (1948), p. 37. Used by permission of the American Psychological Association, Inc.

without an analytical divorce from the total environment. Its object is immediate apprehension with the minimum of eviscerating analysis. The type of generality, which above all is wanted, is the appreciation of variety of value.”*

By being different sorts of persons than we now are? Maslow implies, at one point in his argument, that it is our anxious and neurotic approach to the world that leads us to classify and fend off reality. He imagines a type, more secure.

“Probably feeling more safe and secure fundamentally, they can afford the luxury of responding to, noticing, and even thrilling with experiences which are not dangerous but pleasantly exciting The factor whose variation seems to account for most of these differences is what may loosely be called mental health”†

By taking a different line of approach to reality, by being

“. . . yielding, humble, passive, interested only in finding out what reality has to say to us, concerned only to allow the intrinsic structure of the material to determine that which we perceive.”

And, again,

“We must treat the experience as if it were unique and unlike anything else in the world and that our only effort must be to apprehend its own nature, rather than to try to see how it fits into our theories, our schemes, and our concepts.”‡

The mood of this anti-intellectual, anti-rational, anti-conceptual revolt in psychology seems to say. “Abandon all knowledge, ye who enter here; for knowledge is an imperfect thing and habits chain us to the past. Abandon, also, the fretful purposes of your anxious lives, for your motives lead you to emphasize partial aspects of a total reality, to select as essences those aspects that form a bridge to the known and enable you to work out your petty schemes. Abandon also the task of accumulating concepts; for classes are figments of the classifying mind, the fruit of deadening habits. Forget

* Alfred North Whitehead, *Science and the Modern World*, pp. 284, 285, 286. Copyright 1947 by The Macmillan Company and used with their permission.

† Maslow, *op cit*, p. 24.

‡ *Ibid*, p. 25.

the past, for every present event is an event-with-a-difference. History can teach us nothing for reality is in a flux. The future is different, in any case."

Such a mood, if it were to become widespread and persistent would make us look for social causes. Is it that our culture has lost the certainty of its central purposes and is actually floundering, unable to make *its* concepts work, unable to find relevant examples in *its* past? It was not so with the founding fathers who came to establish a New Jerusalem on these shores. They may have had poor concepts but they had convictions. Has the stream of societal forces run out so that we must take up the Hindu's method of seeking detachment from the world at the very moment his civilization seems to be rousing itself from its introspective slumbers?

It is well to keep the sense of the inadequacy of our concepts, the incompleteness of our abstraction-created view of reality. It is well to keep close to the reality before us, to patiently let it teach us the so-called intrinsic relations, to take time to let the attention play over every aspect of the event before us. That way we shall develop, inductively, better concepts. It may also be wise to leave a space for the pure aesthetic moment, when we enjoy the passing event in and for itself. But we can no more escape the task of adequately conceptualizing our world than we can escape our own nature. Nor would we be men if we could.

REFERENCES

- 1 H. L. Hollingworth, in *Salesmanship*, December, 1916.
Henry Murray, et al., *Explorations in Personality* (Oxford University Press, 1938).
- 2 J. F. Dashiell, *Fundamentals of Objective Psychology* (Houghton Mifflin Company, 1928), p. 10.
- 3 Joseph Wood Krutch, *The Modern Temper* (Harcourt, Brace & Company, Inc., 1929).
4. Kurt Lewin, *A Dynamic Theory of Personality* (McGraw-Hill Book Company, Inc., 1935)
A. H. Maslow, "Cognition of the Particular and of the Generic," *Psychological Review*, 55 (1948), pp. 22-40.
W. Johnson, *People in Quandaries* (Harper & Brothers, 1946)
S. I. Hayakawa, *Language in Action* (Harcourt, Brace & Company, Inc., 1942)
Alfred Korzybski, *Science and Sanity* (Science Press, 1933).

PART SEVEN

The Structure and Dynamics of the Self-System

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CHAPTER 18

The Hypnotic State and the Divided Self

From the animistic beliefs of the primitive medicine man to the latest development of psychoanalytic theory there is a long tradition of inference about the nature of the soul of man. It was originally conceived to be a separable entity capable of leaving the physical body. In the sleeper it often left the body to wander in distant places; and it even visited the kingdom of the dead, returning with vivid impressions as well as with messages for the living. Or so, at any rate, it once seemed to these earlier dreamers as they awakened. Sometime this separable one was conceived of as a material thing, as a something in the blood to be treated with drugs, diet, baths, and a regimen of exercise. Sometimes it was a shadow-like, breath-like, pure spirit. But in either case, from the qualities and powers of this soul-source came the fiery action or the lethargy, the choleric or the sanguine temperament that the body and actions of the living person portrayed.

Early in man's history a primitive psychology grew up around these soul beliefs. Even as late as Thomas Aquinas, a whole system of psychology and ethics was deduced from the nature of the soul. In harmony with revelation the soul was immortal, and it was a unity, and an immaterial thing. United with the body temporarily, it was never thought of as formed by conditions in the body, or indeed by the history of the reactions of the latter in the material world.

We need not dwell upon the details of the history of this soul idea. Suffice it to point out that this internal agency has become—in our theorizing—more and more closely bound up with the history of a physical organism, particularly as this organism reacts to the society of its fellows.

We no longer feel as confident in our ability to see or sense it directly, as were men of earlier times. In fact, we are almost persuaded that there is no *it*, no primal personality apart from the behaving organism, apart from a whole-person-with-a-history-in-a-culture *in action*.

Yet there are inferences pointing—not always too clearly—to a kind of organization *within* this whole-person-in-action which we see. Granted that impulses arise within our very tissues (as they do in all living organisms), granted that the self-system takes shape as the organism comes to terms with its milieu (both personal and impersonal), and granted that our actions become organized and ordered into a view of a world, what is the shape of things *within* this self-system? We have become sensitized to certain qualitative differences within these action systems. Both memories and anticipations can exist in un verbalized forms, one system of beliefs can clash with another—one suppressing and overriding the other. Strong motives within the individual may run counter to the mores—indeed, contrary to the person's own sense of what is fitting and right—and the self's own view of its actions, history, and destiny, can be quite out of line with the judgments of its fellows.

A House Divided

The self-system, in short, is not at peace with itself. It is not the neatly ordered unity of a perfectly designed machine. Its sub-systems are in conflict with each other, and the system as a whole is imperfectly adjusted to its milieu. Its *actions* do not always fit its *words*; the verbal-symbolic system and the overt behavior system are incompletely integrated. Love for an ideal exists beside acts that are counter to the ideal. Its unity seems to be a thing of shreds and patches. It is imperfectly aware of itself. It is not the perfect learner, moving ever toward a more adequate performance; instead, its behavior seems cluttered with fixations, with regressions to old and—from the standpoint of ideal solutions—useless, immature adjustments. Its reasoning is filled with fallacies, false premises, false generalizations, and with problems that seem insoluble because the concepts and essences selected are inappropriate.

Certainly from the standpoint of an ideal outcome we all fall short of that full realization of our powers, that courage and happiness and productivity which our little successes at least permit us to dream of, to hope for. Perhaps it is man's fate to be doomed to eternal frustration, to live—as Thoreau expressed it—lives of quiet desperation; and perhaps at this point we should become resigned to our limitations.¹ Or is there a mode of conceiving this internal organization of the self-system that will enable the expert to locate

the barriers, mobilize and rearrange the forces so as to permit the arrested ones to resume their course of development, so as to enable the frustrated ones to achieve greater satisfaction, so as to resolve the contradictions that make a life seem like an insoluble puzzle? Indeed each of us, as a self, is in need of such a mode of conceiving as a tool to increase his own limited area of freedom, his resources.

At first glance this question raises a host of doubts. Is not this self-system as inaccessible, even now, as it was to primitive man? Is there not a strong dash of megalomania in any expert or "fixer" who would claim to see in others what they cannot see in themselves, to solve for them what their own needs and desires cannot solve, to regulate within them what their own moral forces and integrative powers have not been able to hold in check? Who will be "the man who plays God" in such a psychodrama?

Individually, few dare. Collectively, this seems to be what we are about to undertake. Psychologists, anthropologists, psychiatrists, are searching today for ways of describing the basic personality structure of our culture—seeking to weave together the findings of biology, psychology, and medicine, fitting their conceptual systems into the pattern achieved in the scientific study of culture—all to the end that man can solve the problem of man. The individual and his society—all affirm—are inextricably bound together; whether we look directly at man's behavior or attempt to infer what goes on within, we need bio-social concepts. Inner conflicts are projected outward; outer conflicts are internalized. But, not content with having drawn the map of these relationships, this group of social scientists seems about to propose that we can rearrange both the structure of the self-system and the relations between man and man, to the end that a more rational, more satisfying, more productive existence will become possible.

CONSCIOUS AND UNCONSCIOUS

How shall we attempt to infer that which—throughout the history of psychology—has been least visible? What inner hierarchy shall we hypothesize? Shall we give Reason the supreme position, holding impulse and emotion in check? Or shall we affirm, as many have done, that man's behavior is basically irrational, non-logical, impulsive, and that Reason is a mere gloss on behavior that is basically determined by blind bio-physical forces? Shall we say that Consciousness rules, that our feet move along paths dictated by a cognitive map, a verbal-symbolic system, and that man is essentially a creature who knows his goals? Or shall we look upon the Unconscious as a

kind of primitive mind-stuff at work before awareness dawns, continuing to dominate behavior even after the conscious self has developed, throwing up into the small, dimly lit chamber of awareness only those bits and fragments that fit into its plans, plans rooted down among the cells and never fully revealed at the conscious level? Are our conscious forecasts like the fictions and myths of primitive man, so that we virtually live in a dream world? Or are they reasonable, based upon an ever more accurate, objectively validated map of reality—like the constructs of science?

Or are all these questions essentially meaningless, testifying merely to the thinker's tendency to re-ify qualities into things, forces, entities, to seek for universal answers and fixed categories when the stream of life is an ever-changing flux which refuses to respect all boundaries?

Although it is but a beginning, one distinction has become clear; and it forms the foundation of every modern conceptual system that attempts to deal with the structure and dynamics of the self. There are more things moving within the self-system than the self is aware of. This can be demonstrated experimentally.

Hypnosis and Post-Hypnotic Suggestion

In employing hypnosis to establish a basic concept, the psychologist is in an embarrassing position. He does not understand clearly the forces with which he works, his success varies from subject to subject, and occasionally—for reasons he can not always enumerate—he meets with failure. In spite of his ignorance, and in spite of variations in interpretation and emphasis, there is general agreement upon a central core of facts. With most subjects (estimates range from 70 to 90 per cent²) varying depths of the hypnotic state can be induced by any one of several variants of a method described by Bernheim in 1889.³ The following simple procedure has been found to be successful:

Seat the subject in a comfortable position and urge him to relax as much as possible. Direct the subject to fixate upon some object—the operator's eye, a coin, a point of light of medium brightness. It will facilitate matters if the rest of the visual field is darkened so that there are few distracting stimuli in the periphery of the visual field. If the fixation point is placed slightly above the natural line of regard a moderate fatigue of the eye muscles will operate to strengthen the verbal suggestions. Then, quietly, confidently, and somewhat monotonously, the operator offers suggestions of relaxation, sleep. The exact wording is not too important, the meaning of the words and the manner of enunciating them are what count. Let the operator repeat:

“Relax. Think of nothing but sleep. Give me your full attention. Listen to

my voice, but watch the light. You are tired. Your arms are tired. Your legs are tired. Your whole body is tired, and relaxing. As you watch the light you will find that your eyes are getting heavier, and heavier. Breathe easily, and slowly. Just let yourself go. Now your eyes are closing, slowly closing, tighter and tighter. You can't hold them open any longer. You can't lift them. You are going to sleep. Sleep. You are sound asleep." And so on.

If the experimenter chooses, he may use passes, but apart from a possible suggestion value (depending upon the subject's notions) they are superfluous. Within from one to ten minutes a good subject will fall into the trance state. He may try, for a few times, to open his eyes (as can be seen from his lifted brows or a flutter of the lids), but eventually his relaxed posture, closed eyes, and steady breathing will indicate that he has succumbed to the suggestion.*

With a good subject who passes rapidly to one of the deeper levels of hypnosis the command can be given, "When I count to ten you will open your eyes; but you will remain fast asleep." As the operator arrives slowly at the count of "ten" the lids will flutter, and then open; and the subject, with a rather vacant stare, will seem to look out upon a visual field without fixating. Such a subject is ready to participate in experiments which demonstrate a strange set of phenomena.

Hallucinations and anesthesia Such a subject can be made to "see" objects and persons who are not present. He appears to live through suggested scenes with all the virtuosity of an imaginative actor. He accepts the paper with a smudge upon it as the passport photo of his wife, taken two years ago. He struggles to read the page of print which, you have assured him, is a reprint of one of his own compositions written some time ago in English I; and he will do this in spite of the fact that the book in his hands is actually a textbook in organic chemistry. Some subjects will hesitate, insisting that the picture is not a good likeness, or that the print on the page is blurred, or that their vision is not too good in this light; but with urging the good subject will accept the suggestions and act upon them. The fact that he can actually reproduce large blocks of the theme written long ago will surprise the subject when he is told, on waking, what he has recalled; for in his waking state his powers of recall are less efficient. Under the experimenter's suggestion, in the trance state, he not only can recall with unusual vividness, but he seems to be able to see this material as though it were projected upon the page before him.

* This paragraph and the preceding one are from Cole, *General Psychology* (McGraw-Hill Book Company, Inc., 1939), pp. 522-523.

In the hypnotic state the operator's words direct the subject's responses as effectively as though word and image had been repeatedly paired. However, a good subject is more than a mere automaton. Accepting the experimenter's direction he enters a role, plays a part, solves problems, plans activities, with all the zest and concern of a person living through real events. In fact he may take matters into his own hands, inventing new projects not planned by the experimenter. Accepting the operator's suggestion that he is now going to meet Mrs.—— (the matron of the dormitory where he takes his meals) the subject can be "introduced" to his room-mate; and he will assume a very proper and polite attitude (such as he ordinarily shows toward older women) and will carry on a sober conversation.

He may reveal facets of his nature that the experimenter had not anticipated. Watkins describes an experiment in which a young soldier drew a knife and attacked his own superior officer under the hypnotically established delusion that the latter was a Japanese soldier.⁴ Rarely does the delusional quality reach this degree of completeness; usually a modicum of censorship remains, as though a critical observer peered through the fog of illusion, ready to ring down the curtain the moment the action threatens to get out of hand. But when the stress upon the credulity (and the *amour propre*) of the subject is not too great, although the validating objective field lies there before his eyes to contradict the suggestions of the experimenter, the subject remains like one "in a dream walking," disregarding all but the veil of illusion created by the operator's words. The state created by the hypnotic procedures blocks the normal action of the cues from the real situation; the word-created scenes are received as reality.

The completeness of the subject's reaction is indicated by the way in which involuntary processes are affected. Blushing, tears, sweating, GSR's—all appropriate to the suggested events—testify to the pervasive effect of the illusions. This is no ordinary "play acting"; for these response systems are not open to such direct control in the normal waking stage. Even the stomach contractions of the hungry subject at mealtime can be suppressed by a wholly fictitious meal.⁵

An anesthesia of a skin area, for example of the hand, which will permit the operator to thrust a needle through the skin without eliciting withdrawal reflexes or a grimace of pain from the subject, is easily induced. There are records of major operations performed under hypnosis (amputation of a leg, removal of cancer of the breast) and the reports indicate that the suggestions of the operator removed all memory of the operation in the post-hypnotic state. A favorite test used by the commissioners who investigated the claims of the early magnetisers was to thrust a needle or splinter under

the nail of the subject who had received anesthesia-inducing suggestions; and their reports indicate that the subjects did not flinch. Some reflex effects of such stimuli remain even when the subject feels no pain, consciously. Sears has reported that the non-voluntary responses are only partially suppressed. The GSR was present at 78 per cent of its normal strength, pulse changes at 37 per cent of normal. The facial grimaces and the verbal reports conform more closely to the reported absence of pain, the grimace being reduced to 5 or 10 per cent of its normal strength.⁶

That the anesthesia depends upon anticipatory sets induced by the operator's words, that it is not a local or peripheral block of nerve conduction, is neatly illustrated by an experiment of Pattie's. In the so-called Japanese illusion, the subject extends his arms, crosses hands, and clasps hands as the palms are turned inward, then he rotates the forearms at the elbows so that the knuckles are toward the chest. When the hands are placed thus, the finger that is touched is often misidentified. If a hypnotic subject is given the suggestion that his left hand is insensitive, he will accept the suggestion and behave appropriately save when in this special posture. In this latter case he is able to feel the touch on the finger of the left hand but misidentifies it as a touch on the right hand.⁷

Hypermnesia, Post-Hypnotic Amnesia, and Post-Hypnotic Suggestion

The anesthetics and hallucinations demonstrate the degree to which the hypnotic subject is suggestible. In the relaxing, the "giving up" to the experimenter, a state develops in which the implanted ideas reach their full expression without the interference of the usual inhibitory and critical attitudes. It is as though a critical and censoring part of the self-system (as well as the subject's normal grasp of the reality surrounding him) had abdicated, giving over the control of responses to the operator's words. All that is needed is the germinal idea implanted by the experimenter. Not that the subject's behavior is altogether stupid or machinelike. Indeed, carried away by the scene he is acting out the subject may invent parts that were never intended in the experimenter's thoughts. The fact that in most cases a modicum of censorship remains serves to remind us that it is a *person* who is performing, rather than an automaton. Even though the operator is able to weave a veil of illusion which deceives the subject the latter retains a degree of self-consistency. There are roles at which he baulks. In most cases where the experimenter's suggestion is in extreme contradiction to the normal standards of the personality the subject will refuse to comply. Indeed, the trance state may be abruptly terminated at this point, in a fashion analogous to the way in which sleep is brought to an end by the anxiety developed in a nightmare.

It is as though the self-system had given the operator a limited franchise, subject to recall, its abdication is never complete. In other terms: The cognitive map is changed by the operator's words; the person is not

In the lighter stages of hypnosis there is frequently reported a kind of doubling of consciousness: the conscious observer seems to sit back watching the development of the implanted idea, sometimes with surprise, sometimes with an amused tolerance. When a contracture or paralysis is suggested he observes the suggestions take hold, but with a kind of detached and aloof feeling about the action. It contracts The experience is not like that of a voluntary action But when the full somnambulistic stage is achieved and the subject is actively participating in the suggested scene he again acts "as a whole" The normal sense of the real is now attached to the suggested scene. The inexperienced experimenter who has allowed himself to be incorporated into this scene and who tries too abruptly to bring the subject out of it, will be met with incredulity when he asks the subject to waken "I am awake," such a subject may say; and he may be quite unwilling to leave the fictitious scene.

The abdication of the usual controls brings in its train many changes in memory-functions Long-forgotten events, events that are quite inaccessible to the ordinary waking state, are now recalled with ease; and the hazy, barely remembered event becomes a vivid present reality, rich in details A language that has not been spoken for 35 years (since the subject was five) and that is believed to be quite forgotten is now spoken with the accents and phrases of a five-year-old Last night's dream, which cannot now be recalled in the waking state (save as some vaguely unpleasant experience), can be summoned again The speech, memorized for the public occasion three years ago, and now quite lost in that limbo of forgotten tasks, can be delivered with the correct intonation and emphasis when the subject is "put back" into that other occasion by the experimenter's suggestion The number of a particular army form, the detailed information required, can be recalled under hypnosis, although the officer serving as subject has not been in the service for years and refuses, when awake, to believe that he could remember such trivial details if he tried

A second group of changes in memory function appear when the subject is awakened from a deep trance. Although he may have been playing an active role, talking, acting out some scene, he is completely oblivious of what has just taken place, once he is awakened. He may contradict the experimenter's report. Information about his past which he divulged under hypnosis will be corroborated; but he will insist that it has been obtained from some other source, or that the experimenter is trying to trick him into

believing what is not so. Such complete and spontaneous forgetting is characteristic of the deeper levels only; but its appearance can be made more certain if the experimenter suggests, at the close of the trance, "When you waken you will forget all that has taken place."

It is also possible to *preserve* the memories obtained under hypnosis by the simple device of suggesting, "When you waken, you will recall all that you have told me." This device is commonly employed by the clinician who is endeavoring to restore the integrity of a personality suffering from amnesia.

It is possible to implant suggestions under the hypnotic state that will be carried out in the post-hypnotic waking period. Although the subject has been told to *forget the sources* of the impulse—and his post-hypnotic amnesia indicates that, in one sense, he has complied—the act will be carried out. Here is a special kind of forgetting. He can verbalize no account of what took place during the seance, he insists that his last memory was that of the experimenter's words as he fell asleep. Yet he carries out the command, not merely remembering instructions but keeping track of the external cues that regulate the act. He will light a match at 10:30, offer his guest a drink fifteen minutes after waking, open an umbrella when he answers the doorbell, wind the clock when the chapel bell rings, or bring the experimenter a sack of peanuts next Tuesday. (Erickson reports an instance of a post-hypnotic suggestion carried out after a period of five years⁸) Here again the censoring system sometimes operates counter to the impulse, the execution of the post-hypnotic suggestion will then prove faulty. The subject may confess, merely, that he felt a strong impulse to do a very foolish thing (to dance upon a table-top, to give the dean a "Bronx cheer"). Or he may contrive—with considerable ingenuity—to work the action into a setting that gives it a semblance of rationality, laboriously building up to the trivial climax with all the pains of a raconteur who is itching to tell his favorite story. He will also "explain" the winding of the clock by commenting that it sounded "run down." Or, he was looking for a rent in the umbrella, which had leaked the last time he had used it. To the informed experimenter he acts like a prevaricator and a hypocrite; but all evidence suggests that the subject is totally unconscious of any duplicity. For him the impulse is like any other impulse, arising in spontaneous and natural fashion; and as it arises it is accompanied by the gloss of rationality and plausibility that makes the act a suitable thing to do. Only the operator and the audience know that his acts and ideas have their origin outside the conscious self-system. The subject's attitude of rationality is stronger than his insight. His conscious goals seem adequate to him; only the operator knows that the meaning and reasons he supplies are artifacts, inventions.

The Technique of Hypnotic Regression

In searching for the essence of the hypnotic state the observer is torn between two alternatives. On the one hand so many of the phenomena seem to be a realization of the subject's ideas (ideas implanted by the experimenter, to be sure) that no merely physiological-anatomical conception will do. The idea of a "glove anesthesia," an insensitive area embracing the hand and wrist and terminating at a rather sharply defined boundary, conforms to no distribution of nerves. The loss of the power to speak above a whisper leaves vocal cords, intercostal muscles, and diaphragm functionally intact and capable of performing other acts. And the negative hallucination created by the operator's suggestion that a member of the group has left the laboratory corresponds to no simple inhibition of visual function. (When the subject counts the members of the group about him he passes over the "absent" member and behaves altogether as though he were not present, except that *optical reflexes stimulated by this person continue to function*.) Adding these phenomena together one is moved to agree with White that "hypnotic behavior is meaningful, goal-directed striving, its most general goal being to behave like a hypnotized person as this is continuously defined by the operator and understood by the subject."⁹ A review of the history of hypnotic investigations adds to this conviction; for under one investigator sharply defined stages emerge, with another there are seizures, catalepsy, and the like. The subjects seem to oblige the operator, producing what is expected of them.

Aside from the circularity of the definition (which pushes back the explanation of the phenomena into the limbo of unconscious "intentions" which are never measured) there is the simple fact that the extreme suggestibility, the anesthetics and the power to endure pain, the hypermnésias and the power to recall, the degree of dissociation between the trance state and the waking condition, all transcend the powers of our normal intentions. Moreover, where the subject can report upon the state the "feel" of the action is different: the act runs itself, the contraction feels like an involuntary one such as that "pulled out" of the subject by an electrode. Finally, the actual phenomena so far exceed the normal histrionic powers of the subject that the definition seems to conceal rather than describe or clarify the actual state of affairs.

The phenomena revealed when the technique of hypnotic regression is employed illustrate this last point. An operator may say, for example:

"This is no longer the present time. You are going back into the years.

You are getting younger and younger. You're twenty-four years old, twenty-three, twenty-one, nineteen, sixteen, ten, eight, seven years old. This is your seventh birthday. When I touch the side of your head you will be able to open your eyes. You will meet a friend whom you have never seen before, his name is George. He will have something interesting to show you. All right, now you can open your eyes. N, meet George."*

In one investigation, employing this technique, the subject proceeded to give a remarkably convincing portrayal of a seven-year-old. He not only recalled the details of this birthday, naming presents, the guests, and special events, but he also performed in a standard intelligence test as a seven-year-old would do. Tested under hypnosis at regressed ages ranging from 2 to 20 years, one of the subjects gave a consistently superior performance. Calculating IQ (dividing Mental Age by Regressed Age) the variation in values (111-134) for all but two pre-school age levels fell within normal expectancies. And the subject's understanding and use of words corresponded to what might be expected. At 4 the subject was defining orange as "something to eat, looks like a ball"; at 20 he was describing it as a "sweet citrus fruit grown in California and Florida." At 4 he did not know what "lecture" meant, at 5 it had become "a talking to"; at 20 it was "an illustrative or instructive talk." At one and a half he is reported to have "looked at the picture of a hand, turned to bite his own hand, but did not name it, as requested. He followed the pointing finger to the play objects, picked up the doll and strongly resisted giving it up."¹⁰

In control tests run in the waking state the subject insisted that he had little or no idea how children of various ages would answer the Binet test items. He resisted the experimenter's attempts to elicit such information and seemed to think the attempt was both pointless and unreasonable; yet under the suggestions of the hypnotic procedure he had given responses that produced scores falling within the appropriate range for ten different age levels. One is inclined to emphasize the fact that the subject's ability "to behave like a hypnotized person" is much greater during the hypnotized state.

Dr. Milton Erickson reports a case in which the hypnotically induced regression was utilized to extinguish undesirable conditioned responses. One of his patients had acquired a pronounced distaste for orange juice, or anything containing orange flavor, through attempts at self-medication in which castor oil mixed with orange juice had been taken. The aftereffects left the patient "conditioned" to the sight of oranges; even the sight of the fruit in

* Herbert Spiegel; Joel Shor; and Sidney Fishman, "An Hypnotic Ablation Technique for the Study of Personality Development," *Psychosomatic Medicine*, 7 (1945), p. 273. Used by permission.

the store window induced nausea. All attempts at extinction through repetition (without the reinforcing effects of the oil) proved of no avail. Erickson, using the regression technique described above, placed his subject back at a period two years before her castor oil experience. At that time she had been especially fond of orange juice; and in the regressed state she drank a glass of the juice with evident relish. Although she had complete amnesia for the hypnotic experience upon waking, and was not told of what had taken place, she was observed to roll her tongue about her mouth and lips as though trying to sense some elusive taste. Subsequently she reported to Dr. Erickson that, at a dinner party, she had made up her mind to overcome her distaste for orange juice, and, after sorting out bits of orange in a fruit salad, she had suddenly realized that she had been enjoying the orange flavor and had decided to eat the bits of fruit. From that moment she was cured. She seemed rather delighted that she had been able to do for herself what her physician had either been unable or unwilling to accomplish.¹¹

Measuring the Force of Hypnotic Suggestion

The dramatic quality of the hypnotic phenomena tempt the theorist to make rash generalizations about the structure of the self-system. The manner in which unconscious processes control behavior in spite of the subject's lack of awareness tempts one to picture the self-system as mainly controlled by unconscious tendencies and to think of the total system of tendencies—the hierarchy of sets—as like an iceberg, the major portion of which is submerged with only a small fraction showing above the surface “in the light of day.” The length of time over which old constellations of responses persist tempts one to make the further generalization that nothing is ever completely forgotten. It may lie deeply submerged; but the technique of hypnotic regression shows how completely the subject has preserved the most ancient (and even trivial) impressions. And the extent to which the implanted ideas of the hypnotic state work themselves out both in the trance and in subsequent post-hypnotic phenomena prompts one to believe that in hypnosis the therapist has at his command the most powerful tool, a tool capable of correcting all kinds of psychosomatic complaints, of restoring forgotten blocks of memories, of producing a new synthesis of the forces within the personality, of re-forming the character, of removing fears and inhibitions.

These tempting generalizations run beyond the evidence at hand. Apart from the fact that not all subjects are susceptible to the technique, and apart from the fact that our conceptions of the process tend to be founded on the exceptional case, the “good” subject, the effects of hypnosis are limited, variable, and of relatively brief duration. Pierre Janet, who had utilized

hypnosis as a routine treatment in the psychoneuroses, summed up his experience with the cautious estimate that it had proved useful in 250 of his 3500 cases. These were almost exclusively patients classed as hysterical; and they were comparatively young. The symptoms successfully treated were, for the most part, local, and did not involve the person-as-a-whole. Often treatment that alleviates one symptom is followed by the appearance of a new and different symptom, as though some general deficiency in the capacity of the patient to deal with his environment were the basic cause of his difficulties, the symptom being merely the momentarily vulnerable point in his behavioral armor.

In the laboratory, the attempt to measure the persistence of post-hypnotic suggestion indicates that within from one to two months the major after-effects of the hypnotic suggestion have disappeared. Therapy depending upon the persistence of ideas implanted in the trance state would require that the patient return, from time to time, to "have his battery charged"; and a chronic dependence upon the physician could be as unfortunate a "disease" as the symptom for which hypnosis served as a cure.*

Several experimental studies which have sought to measure the hypermnesia of the subject in the trance state have found negative results. A study by Huse, using nonsense materials, and one by Mitchell, using three-place numbers, showed that for this type of *recently learned materials* the waking state is as efficient as the trance. In a third experiment Young asked his subjects to recall the objects in an adjoining room which had been casually observed; and, again, the trance state was not found to be superior.¹³ These results have led some theorists to seek an explanation for the experimental findings in kinds of material (the childhood memories and the traumatic experiences which appear in the clinical studies as against the less vivid and more artificial memory materials of the laboratory studies).

Stalnaker and Riddle give a hint as to why their subjects did better in their long-term recall experiment in the trance state.¹⁴ Under hypnosis one of their subjects wrote the following version of "The Village Blacksmith."

The smithy whistles at his forge
As he shapes the iron band;
The smith is very happy
As he owes not any man.

Such a sample, with displacements and alterations, is a poor reconstruction

* Here and there the journals report more persistent successes. Using hypnosis as a means of suppressing pain in a condition not otherwise open to cure one group of investigators reported a successful outcome lasting over periods of several years.¹² Most of the evidence indicates a rapid fading of the post-hypnotic effects.

of the original; and the experimenters feel that the subject would have discarded it in his waking recall. It is thus possible that the hypnotic state is one in which the subject is somewhat less critical of his products, and that, relaxed as he is, he permits his "near misses" to develop; and with each near miss developed further associates can be brought up. The critical waking condition, rejecting that which is incorrect, also rejects material that—if accepted and allowed to develop—would act as a facilitator for further correct recall. A person often finds, in attempting to recall a name, that while his first guesses are incorrect, if he will jot them down as they arise, keeping them before him, they will finally lead him to the correct name. To his surprise he frequently discovers that although the first guesses were incorrect they contained parts of the correct name, or the correct number of syllables, or a similar sound pattern, or a name closely associated with the one sought—as though the correct response, functioning just below the threshold of recall, were operating to shape each attempt. It may well be that the hypnotic state facilitates the recall process because the attitude of the subject is tolerant and confident. But such an attitude also permits error, and false recall is also accepted as fact. There is room for careful study of the accuracy of this power of recalling remote events, especially under circumstances permitting precise objective measurement.

THE HYPNOTIC STATE

The history of hypnosis is virtually a history of psychological theory. As one systematic viewpoint has succeeded another, each has tried to fit the phenomena into its conceptual scheme, with varying degrees of success. At best there remains much that is unexplained.

The Physiological Approach

The name *hypnosis* was suggested by Braid (1899), who, in rejecting Mesmer's ideas of magnetism and magnetic fluids, chose to link it with fatigue and sleep. The monotony of the repeated suggestions of sleep and relaxation, the narrowing of attention to the operator's voice, the fatigue and eyestrain of the prolonged fixation, are all conducive to sleep; and the state itself passes easily into genuine sleep. Like the sleeper, the subject has withdrawn his interest from the outer world; only one small channel of contact is maintained. As Freud was to note, later:

"The situation is the same as if the hypnotist had said to the subject: 'Now concern yourself exclusively with my person, the rest of the world is quite

uninteresting . . .' The command to sleep in hypnosis means nothing more nor less than an order to withdraw all interest from the world and to concentrate it upon the person of the hypnotist. And it is so understood by the subject; for in this withdrawal of interest from the outer world lies the psychological characteristic of sleep and the kinship between sleep and the state of hypnosis is based upon it."*

The suggestions, carried to the central nervous system of the subject by the auditory nerves, are pictured as occupying a small island of wakefulness; and, contrary to the normal alerted state, there are no inhibitory "sets" to redirect, to block the spread of impulses. Pavlov and others have tried to explain the behavioral facts by postulating foci of excitation in which excitatory chemical substances are produced, surrounded by a field in which other inhibitory chemical substances "numb" the centers. This concept of chemical substances—fitting in with the work of the physiologist on the chemical character of nerve transmission—has not, as yet, thrown very much light upon the phenomena of hypnosis. There has been no chemical analysis of substances in the various areas of the brain, nor do the electroencephalographic studies of electrical potentials show clear-cut evidence that the brain is functioning as in sleep, or in any manner different from that of the ordinary waking state.

Others have suggested that the technique alters conditions in the "sleep center" (or, more properly, the "waking center"). Cutting down the sensory inflow, which normally maintains excitation of this hypothalamic center, should produce gross alterations in reflex excitability; but the experimental evidence does not support this anticipation. Neither does the behavior of the subject who reasons, computes, recalls, plans, performs skilled actions, correspond to that which might be expected in a sleeper. Although the monotony, relaxation, and suggestions of sleep seem calculated to throw into gear the biologically useful sleep-mechanism, and although—viewed superficially—the subject's relaxation and closed eyelids look like sleep, there is nevertheless too much in the behavioral data that fails to fit this hypothesis.

The Stress upon Motivation and Interpersonal Factors

The current fashion in theory has brought forward concepts of motivation and a stress upon interpersonal relationships and needs. McDougall introduced this trend, some time ago, when he emphasized the way in which the

* Sigmund Freud, *Group Psychology and the Analysis of the Ego*, translated by J. Strachey (London: The International Psycho-Analytical Press, 1922), pp 96-98.

subject "gives up to the experimenter"; and, in line with his general theory he attributed this to the strength of the "instinct of submission." The fact that whatever enhances the prestige of the experimenter increases the susceptibility of the subject is advanced in support of this notion. Prince speaks, also, of "a rebellion against the conditions of life" (a rebellion coupled with a desire to get away from the stresses of personal conflicts) as a factor underlying this "giving up", this willingness to enter the trance state. But he also offers an example of a patient who could not "let go" until Prince had charged her with cowardice; in order to "show him" she promptly entered the deep somnambulant state of hypnosis. And Prince is ready to accept such motives as curiosity, self-assertion, and all the mixed motivations of everyday life, cautioning us to note that whatever the motives for entering the state may be, they do not account for the anesthetics, paralyses, contractures, hypermnesia, dissociation, and the like, revealed once the state is in force.¹⁵

There is a circular character to these explanations. Since there are no independent measures of the "instinct to submit," or of the motives of rebellion, escape, curiosity, self-assertion, they represent little more than after-the-fact impressions. Perhaps the best of the recent uses of the motivational analysis of hypnosis is White's definition (referred to above, page 660) which states: "hypnotic behavior is meaningful, goal-directed striving, its most general goal being to behave like a hypnotized person as this is continuously defined by the operator and understood by the subject." Yet, even apart from its circularity, the definition fails to cover the case in which the phenomena run far ahead of any knowledge or anticipation of the subject. The subject does not have to know about post-hypnotic amnesia in order to show it, to name but one example. It is not otherwise with the hysterical who suffers from a restriction of the field of vision. He sometimes comes to the physician with an altogether different complaint; and the visual facts are unknown to both patient and physician until a careful examination reveals their existence. The students of hypnosis were slow to discover the importance of the ideas and intentions of the subject, but now that their power is generally recognized it would be unfortunate to swing to the opposite extreme and to assert that no phenomenon is forthcoming unless it has been prefigured in the intentions of the subject. In any case, the task of explaining how, under hypnosis, these ideas and intentions have the power to work their effects in a manner that transcends our ordinary capacities, would remain.

The psychoanalytic school also stresses the interpersonal aspects of the hypnotic situation, seeing in the surrender of the subject a revival of earlier parent-child relationships, a transference of an emotional attitude upon a

father or a mother-figure. There is a revival of an earlier love relationship, they would say. Schilder expresses it: "Persons strongly disposed to love, persons with the tendency to fixate love objects powerfully, customarily are easily inducted into profound hypnosis."¹⁶ Repressed infantile sexual thoughts, inadequately resolved Oedipus situations (Chapter 21) permit the hypnotist to step into the place of a fantasied and idealized parent to whom, in perfect trust, the weak and inadequate subject can, and needs to submit.

The fact that these same factors have been present throughout the life of the patient and through all of the relations with his physician leaves us without any basis for distinguishing between hypnotic conduct and the rest of the patient's behavior. Nor is there any systematic investigation of the relationship between the existence of unresolved Oedipus complexes (and the disposition to fall in love) and the susceptibility of subjects to hypnosis, to support the generalization. Although we make note of it as one clinician's opinion, we have but to place it in juxtaposition to the opinions of Janet and Prince (whose experience is also wide) to indicate that it is, after all, an opinion.

Hypnosis as a Change in the Self-System

An alert and wakeful subject, on the *qui vive*, in active contact with his surroundings, and working purposefully toward a goal, evaluates, weighs, criticizes every suggestion, every stimulus. His cognitive map, his needs and purposes, his expectations and standards constitute an active frame-work into which each stimulus must be fitted; and unless he gives consent (since the anticipated consequences of action seem desirable) the action is not released. Between the stimulus and the act there exists a pause that validates. In this interval false generalizations can be detected, faulty automatic habits can be checked by other habits, the hunch can be replaced by mathematical reasoning, and a wider area of experience can be brought to bear. As wider areas of the personality become involved the action becomes increasingly rational, voluntary. Actions are preformed, intended, released with consent.

In hypnosis, this active grasp of the field and this involvement of a wide area of experience are decreased. Passive, and with the active systems narrowed to those aroused by the operator's voice, the implanted ideas have their way. To be sure the subject brings an assortment of experiences, habits, automatisms. He cannot produce a response, such as piano-playing or the reading of Sanskrit, that he has never possessed. In this sense the idea that works itself out has to utilize his habit systems. In this sense White's phrase,

"as this is continuously defined by the operator and *understood by the subject*" gives a correct emphasis. But under hypnosis his habits, normally subject to various inhibitions, controls, unroll without full critical appraisal by an alert self-system, or without the facilitating and inhibiting influences of the usual directing and competing sets. The words of the experimenter set up a train of effects—call them conditioned responses—which penetrate to gland and muscle, reinstating experiences long forgotten, experiences that simulate with hallucinatory vividness a reality not now before him. And there is an unusual degree of automatism about these developing responses; each "system" that is evoked seems dissociated from other systems to an unusual degree.

There are thus both negative and positive aspects to the state. There is the weakening of that *regnancy*, that active self in contact with its milieu; and there is that expanding and proliferating suggested train of responses, which develops without hindrance.

So described, the hypnotic state represents the extreme of a series of conditions that extend into the waking state. The normal, waking person is often impressed by the suggestions of the physician whom he trusts; and frequently he carries them out—even to the tissue changes—as the hypnotic subject does. We call him suggestible when the salt-water hypodermic sends the sleepless patient off to a good night's rest. And the "surrender" is shown by the very tissues when the reassurance brought by the consulting specialist produces a prompt drop in temperature. Even in the laboratory, the expectancies developed, as in Ellson's experiment (page 429) with its plan of interjected test trials placed in a conditioning series, produce auditory experiences of hallucinatory vividness when no objective tone is present and when the subject is in a waking state. In sleep, relaxed and detached, we re-experience old events, see long forgotten faces, with the vividness of the recall of the hypermnesic hypnotized subject. And our temporary forgetfulness of a well-known name illustrates a degree of that amnesia, that dissociation, which obtains between the trance and the waking states.

The hypnotic state, thus related to everyday experiences, represents the extreme of a series in which the interplay of facilitation and inhibition produces every degree of emphasis or blocking. The state is somewhat like the "letting go" of sleep; it is like a simulated series of actions by a consummate actor who "strives to behave like a hypnotized person"; it is a kind of "giving up" like that of a trusting child to a wise and loving parent; and it often seems to be a kind of flight from life and its conflicts by a person who has a strong wish to submit and a need for magical solutions that is as great as his own lack of resources to meet and surmount these difficulties. But none of these

analogies holds perfectly; and, as yet, we lack the measures that will enable us to predict that *this* individual will be susceptible, *that* one not. Nor are we quite clear how a technique seemingly concerned with inducing a merely *physical* relaxation should so completely short-circuit the critical self while leaving the habit systems lively and accessible to the experimenter. While each approach sheds some light upon the phenomena, basic questions remain unanswered.

How, for example, is the state related to the experimentally induced catalepsy in the lizard, the domestic fowl? Stroke the belly of the lizard, or lay the fowl on its side on a hard surface, and a rigid, cataleptic posture is produced—a catalepsy strongly resembling that which can be induced in the hypnotic subject. Is there some ancient neural mechanism inherited from remote ancestry that, once tapped, renders us as helpless, as pliable as the “charmed” animal?

And how, with our stress upon the prestige of the operator, the Oedipal relationship, the father-fixations, are we to account for those persons who have found a way to induce their own trance-states? Or for those patients who react to chronic emotional stress or to the trauma of accidents, with the somnambulistic states, amnesia, and dissociated consciousness comparable to those found in hypnosis. And if we follow Janet in describing these patients as hystericals—as easily dissociated persons who, through inherited or externally induced weakness in their psychological makeup, lack the energies required to maintain full integration and good rapport with their environment in the face of stress—how shall we consider the report of the anthropologist who finds that half of the adults in a Balinese village know how to induce trance states in themselves? Does the proportion of hystericals run so high in Bali? Is there some peculiar quality in the Balinese constitution? Or does their culture and their method of child-rearing produce a life style and a personality structure unusually susceptible to dissociation? Or how shall we evaluate the reports of those investigators who find that 80 per cent or more of our own population are susceptible to hypnotic techniques to some degree?

In spite of the depth of the ignorance still surrounding the phenomena of hypnosis, we have come a long way from the days of Mesmer, who believed that a magnetic fluid passed from the hands of the magnetiser into the body of the patient, rearranging the animal spirits and polarizing them in a healthful manner. Before leaving the discussion it might be well to re-

* Mead notes. “There is no apparent difference in the character structure of the people in villages where trance is shared by all and those in villages where no one ever goes into trance.”¹⁷

mind ourselves of those generally agreed-upon facts that have the best basis in experimental and clinical observation.

1. All of the phenomena of hypnosis are present in some degree in the waking state.
2. The great majority of the population are susceptible to the technique in some degree
3. Fatigue, monotony, fixation of the eyes, and suggestions of relaxation and sleep are sufficient to induce the state in susceptible subjects
4. Chief among the phenomena found are:
 - a. Hypersuggestibility, affecting most of all the voluntary responses By creating appropriate situations suggestions produce changes in the glands and viscera.
 - (1) Anesthesias, hallucinations. The anesthesias affect the voluntary system more profoundly than the involuntary or reflex system. Thus, although suggestion produces a visual anesthesia that affects all voluntary visual activities, there remains a residue of involuntary reflexes in the pupillary and lens systems
 - (2) Contractures and paralyses in voluntary muscles which surpass the normal limits of control.
 - b. Hypermnnesia, especially for old and meaningful events.
 - c. Post-hypnotic amnesia and post-hypnotic suggestions In these experimentally induced dissociations there is clear demonstration of the power of unconscious impulses to control behavior, and of the tendency of the subject to give plausible and rational explanations for his conduct without regard for the real source of the impulse
- 5 There is a decrease in the power of the self-system to control responses, to criticize and to impose counter-suggestions, yet there remains a censoring self in the background, a self that does not permit the subject to act in a manner contrary to its deepest convictions or moral standards. In exceptional subjects (and in cases where the experimenter exercises sufficient care in creating a fictitious situation, which provides a sanction for the act) the objective behavior of the subject will transcend these boundaries (Rowland's subjects reached for rattlesnakes; Brenman's subject told of personal experiences and desires the subject had concealed in the waking state, while a second subject stole from the experimenter's purse; Watkins' subject attacked his superior officer with a knife.)¹⁸
- 6 Hysterical, immature, and dependent adults are reported to be more susceptible than other persons. The very dull, the very young, the very

old, the rigidly organized as well as the extremely independent personality, make poor subjects. Among those susceptible are found many normal individuals of high intelligence. In spite of these widely accepted clinical judgments, personality inventories designed to differentiate between the normal and the neurotic have not made a good basis for predicting susceptibility.

7. The therapeutic aftereffects of a therapy limited to hypnotically induced suggestions tend to be local and transient. The "person-as-a-whole" is neither radically nor permanently altered by the procedure. Yet there are cases on record of a sudden, and permanent, cure of symptoms that had endured for more than 20 years prior to treatment. Janet reports but 7 per cent success in his clinical experience.
8. There is a widespread impression to the effect that the dissociated, unconscious, memory-systems are impervious to extinction, to the corrections and emendations that come with new experiences. To this is added the belief that by "bringing the unconscious system into the light of day" (that is, into full consciousness) it can be modified and will lose its power to produce symptoms. The experimental evidence collected by Hull and his pupils indicates that the dissociation from waking experiences is not complete, and that the hypnotically implanted unconscious idea fades, losing its power to affect behavior. The clinical evidence is most contradictory on the latter belief, some asserting great success and others making more modest claims. The tendency to report the successful (and not the unsuccessful) attempts at therapy probably creates the impression that the ventilation, in consciousness, is more powerful in its therapeutic aftereffects than is actually the case. There is a strong "wish to believe" that can only be guarded by experimental and statistical controls which, so far, have been rarely applied.

THE IMPLICATIONS OF THE HYPNOTIC EXPERIMENTS

The data that emerge from the studies of hypnosis have to be interpreted in the light of a general theory of behavior. We are confronted, therefore, with neurological, psychoanalytic, motivational, and interpersonal interpretations of the observed events as various investigators have applied the conceptual systems of their specialties. But the data have also left their indelible mark on each of these systems. Whatever conceptual system is used, the data indicate that certain basic relations exist within the self-system;

and it is to the extraction of these implications from the welter of facts that we now turn our attention.

Let us begin with the data on *recall*. If we symbolize the facts in a diagram (see Figure 118) the region *C* represents all those memories easily accessible to the waking person; *U* represents the inaccessible memories. If we think of the person who recalls as one who pauses in the course of climbing a hill, and who turns to look back at the course he has traversed, pointing to and naming the places he passed through on the route, each memory is a posture, a naming, a pointing. And as he points to a spot his eyes may assume a far-away look; he is, we then say, abstracted. And shortly thereafter he will report to us, "I was just thinking of that first tough climb. It seemed to me that I was there, again."

Here are two memory postures: (1) the pointing back while keeping fully oriented in the present, and (2) the slipping into the old posture, the re-living, along with a kind of "absence" from the present. In the first posture, much of the color and flavor of that former event is lost. Its sensory feel is not revived, the original needs and desires are no longer active. Important though it was then, it is cramped into a small corner of the present system of tensions and expectancies. Indeed, it may be quite distorted. I remember what it probably was like (as I now think back) rather than what it *was* like. This type of memory, like perception, is concerned with probable happenings. As surely as I am different, now, the memory is no mere reproduction.

In the second posture, particularly if the abstraction is complete, the present is lost. The ongoing climb is abandoned. The one who is wrapped in his memories has relaxed his concern with the next steps, his contacts with and his hold upon his surroundings. He may be so abstracted that he mis-identifies the sound of the words that strike his ears, and he mis-locates them, reacting as though they came from the lips of someone in that other scene.

In our ordinary recall we use the first posture, as surely as we are absorbed in practical and pressing concerns. Even when we try to recapture the look of a face, the feel of a stiff salty breeze, the tug of game fish on the line, we cannot, wholly. Present concerns are too much with us. We cannot let go. And then, to our amazement, in some later dream the long-lost face is there with all of its fleshly beauty, the salt tang is on our lips, the fish is struggling on the hook.

What the hypnotic state does is to increase the area of accessible memories of both types. Some we have lost—to our waking experience—so completely that we cannot even point to them; neither word nor gesture can locate them. They *are* not, it seems. We were *not* there. There is not a trace

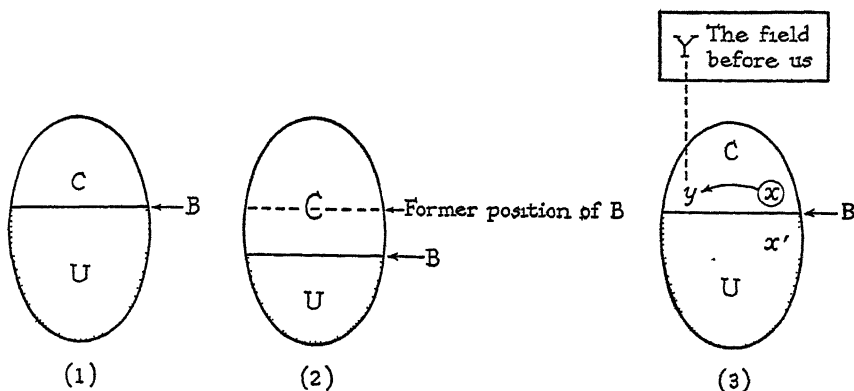


FIGURE 118 Schematic diagrams indicating the type of division within the self-system implied by the hypnotic experiments

(1) Let *C* represent the region of easily aroused memories and percepts. *U* represents the region of inaccessible traces. These latter memories and percepts, while not available for conscious recall, are conceived to be capable of acting below the level of awareness. *B* represents the functional barrier which walls off the *U*-system.

(2) The lowering of the barrier under hypnosis, enlarging the *C*-area.

(3) Diagram representing the situation in which post-hypnotic suggestions are carried out: *x'*—the implanted (but forgotten) command now persisting in the *U*-system; *x*—the act the subject was directed to perform, now consciously referred to the object *Y* (in the field the subject sees before him) or to *y* (thought, object, or relationship of which the subject is aware and to which he assigns casual efficacy).

to symbolize them. Somehow the trance-inducing words, the setting, and the interpersonal rapport, produce a surrender, a giving up of the attitude of concern, the grasp upon a present place in time and space, a relinquishing of the everyday attitudes of attacking, defending, acquiring, fearing. Relaxed in this fashion the barrier (*B*) melts away. The simple phrase, "Today you are five years old" sets in train a series of experiences, a reliving: the presents in the morning, the party, the cake, the lights . . . all are there once more. And what to an adult, concerned with adult problems, had been described as "gone with the wind," is discovered to be there, vivid, exciting, fresh, surprisingly complete. A child persists within us, with childish speech and childish interests—a child who cannot write, a child with a childish theory of birth and death, of good and evil, a child dependent upon a Mother and Father who appear as King and Queen. We thought that we had put away these childish attitudes and theories as surely as our knowledge had grown with our bodies. We thought that we had forgotten what could not be recalled consciously, in our everyday attitude of adult concern.

The permeability of the barrier (B) varies. The hypnotic state represents one of its most permeable conditions. We might symbolize the state of affairs in the trance by Figure 118 (2). The area U containing the residue of unrecallable memories has shrunk, and C has expanded. A barrier still remains. Where therapists have used hypnosis as an adjuvant technique along with psychoanalytic methods of probing for early memories, long and persistent effort—even under hypnosis—is sometimes required to push back this last barrier; and when an operator has done his best there will remain a very early period, as well as some “islands” where special experiences are most heavily guarded.

The data of the experiments also show that the memories restored under hypnosis can be reintegrated with the C -system in such a way that even under the pressures of everyday living, in the ordinary waking state, they remain accessible. The C -area thus becomes more or less permanently enlarged, a new degree of integration in the self-system becomes possible.

Post-Hypnotic Effects Re-evaluated

Of even greater significance for our conception of the dynamics of the self-system is the post-hypnotic behavior of the subject who continues to act under suggestions given during the trance state. When the subject shows a complete amnesia for the events of the hypnotic session (in the sense that he is unable to imagine or give a verbal description of these events) and—in spite of this amnesia—carries out precise instructions, we can see that for all of its inaccessibility, its “forgotten” quality, the memory is neither dormant nor ineffective. Referring to Figure 118 (3): x' implanted in the subject under hypnosis, has now dropped into the U -area; but it affects events in the C -system. Furthermore, when questioned, the subject interprets and explains the x -caused act in terms of possible causes (y) in the C -system (and in the objective field), giving plausible explanations which are congruent with his experience, with the field as he interprets it (including within this field the subject's conception of the C -system of the questioner).

Still more difficult to grasp is the fact that x' may consist in directions requiring for their fulfillment a continuing vigilance, a noting, relating, comparing. The hypnotised subject may be told, for example that:

“... after waking he is to multiply subconsciously a pair of numbers, the product to be written automatically in the waking state but without the subject's knowledge. One of the pair of numbers to be multiplied is the number of taps the experimenter makes while the subject is looking at a book. The sec-

ond of the pair is to be that on the right-hand corner of the page fixated by the subject at the moment when the experimenter asks for the book. At this point the subject is awakened from the trance by a prearranged signal. Upon preliminary questioning, the subject now insists that he is awake and does not recall anything from the trance just concluded. The subject is then handed a copy of *Aesop's Fables*, and told to find a page containing three fables. While the search is in progress the experimenter taps three times. He then takes the book from the subject when the latter has it open at page 41 and asks him to repeat some verses which he knows well. The recitation is performed easily and without obvious distraction. Meanwhile the hand, presumably behind a screen, is writing over and over the number 123, which is the correct product of the multiplication . . . the subject at the very moment when the writing is in progress insists in reply to questions that his right hand is doing nothing and that he is fully awake . . . Upon being put back into the trance, the subject is able to recall the fact of automatic writing just performed and the nature of the multiplication which led to it . . .”*

Facts of this type have been reported on numerous occasions, and they require that we look upon the *U*-area as something more than a repository, a physiological container of traces. Instead we must conceive of the *U*-process as developing, changing, maturing and constantly affecting the *C*-area. Indeed, the *U*-process has direct access to the musculature, producing changes in glands and muscles. If we are reluctant to call the *U*-processes *mental*, this is undoubtedly because our tradition inclines us to equate “mental” with conscious, verbalizable, recallable. Yet it is very difficult to resist the impulse to call them mental. Indeed Prince urged us to conceive of a co-conscious mind; for the phenomena imply a vigilant, watchful, co-acting self-system—a capacity to reason, to combine experiences, to utilize the past, to do all that a conscious self-system can do. Indeed, upon being re-hypnotized the subject indicates that in some part of him there was one watching, recording, storing impressions, one who now can tell the experimenter everything that transpired.

We are two minds, not one. Or perhaps we should try to conceive of a hierarchy of systems, of levels beneath levels, with a top level where full awareness and capacity to verbalize give us an illusion of unity, integrity, and rationality that the study of hypnotic phenomena belies.

* Clark L. Hull, *Hypnosis and Suggestibility* (D. Appleton-Century Company, Inc., 1933), p. 175. Used by permission of Appleton-Century-Crofts, Inc.

REFERENCES

1. See the discussion of Erich Fromm's more optimistic thesis in a review of his *Man for Himself* by George Kimmelman ("Moral Maturity and Psychology," *American Journal of Orthopsychiatry*, 18 (1948), pp. 552-554.)
2. Margaret Brenman and Merton M. Gill, *Hypnotherapy* (International Universities Press, 1947), p. 42.
Robert W. White, *The Abnormal Personality* (The Ronald Press, Inc., 1948), p. 201.
3. Hippolyte Bernheim, *Suggestive Therapeutics*, translated by Herter (G. P. Putnam's Sons, 1889).
4. John G. Watkins, "Antisocial Compulsions Induced under Hypnotic Trance," *Journal of Abnormal and Social Psychology*, 42 (1947), pp. 256-259.
5. Julian H. Lewis and T. R. Sarbin, "Studies in Psychosomatics. I The Influence of Hypnotic Stimulation on Gastric Hunger Contractions," *Psychosomatic Medicine* (1943), pp. 125-131.
6. R. R. Sears, "An Experimental Study of Hypnotic Anesthesia," *Journal of Experimental Psychology*, 15 (1932), pp. 1-22.
7. F. A. Pattie, Jr., "The Genuineness of Hypnotically Produced Anesthesia of the Skin," *American Journal of Psychology*, 49 (1937), pp. 435-443.
8. M. H. Erickson and E. M. Erickson, "Concerning the Nature and Character of Post-Hypnotic Behavior," *Journal of General Psychology*, 24 (1941), pp. 95-133.
9. R. W. White, "A Preface to the Theory of Hypnotism," *Journal of Abnormal and Social Psychology*, 36 (1941), pp. 477-505.
10. Spiegel, et al, "An Hypnotic Ablation Technique for the Study of Personality Development," *Psychosomatic Medicine*, 7 (1945), pp. 273-278.
11. Milton H. Erickson, "Hypnotic Investigation of Psychosomatic Phenomena: A Controlled Experimental Use of Hypnotic Regression in the Therapy of an Acquired Food Intolerance," *Psychosomatic Medicine*, 5 (1943), pp. 67-70.
12. Roy M. Dorcus and Frank L. Kirkner, "The Use of Hypnosis in the Suppression of Intractable Pain," *Journal of Abnormal and Social Psychology*, 43 (1948), pp. 237-239.
13. B. Huse, "Does the Hypnotic Trance Favor the Recall of Faint Memories?" *Journal of Experimental Psychology*, 13 (1930), pp. 519-529.
M. B. Mitchell, "Retroactive Inhibition and Hypnosis," *Journal of General Psychology*, 7 (1932), pp. 343-358.
P. C. Young, "An Experimental Study of Mental and Physical Functions in the Normal and Hypnotic States. Additional Results," *American Journal of Psychology*, 37 (1926), pp. 345-356.
14. J. M. Stalnaker and E. E. Riddle, "The Effect of Hypnosis on Long-delayed Recall," *Journal of General Psychology*, 6 (1932), pp. 429-440.
15. Morton Prince, *Clinical and Experimental Studies in Personality* (Sci-Art Publishers, 1939), pp. 164-165.
16. P. Schilder and O. Kauders, *Hypnosis* (translated by S. Rothenberg) Nervous and Mental Disease Monograph Series, No. 46 (1927), p. 118.
17. Gregory Bateson and Margaret Mead, *Balinese Character: A Photographic Analysis* (New York Academy of Science, 1942).
18. L. W. Rowland, "Will Hypnotized Persons Try to Harm Themselves or Others?" *Journal of Abnormal and Social Psychology*, 34 (1939), pp. 114-117.
M. Brenman, "Experiments in the Hypnotic Production of Anti-social and Self-injurious Behavior," *Psychiatry*, 5 (1942), pp. 49-61.

CHAPTER 19

Freud and the Psychoanalytic Movement

Whether or not the viewpoint of the historian, a hundred years from now, will sustain the evaluations Freud's contemporaries expressed at the time of his death, any account of the structure of the self-system—as it is viewed today—would be incomplete if it neglected the contribution of Sigmund Freud. Not long ago William McDougall was ready to call him the greatest contributor to psychology since Aristotle.¹ He has been classed with such men as Darwin, Einstein, Marx—in fact with whomsoever the classifier holds to be of the very greatest importance in the history of ideas. There is scarcely a contemporary dramatist or novelist whose works do not reveal his influence. Anthropology and sociology, after first damning him, have taken over a great deal of his doctrine. The field of psychiatry is at present so influenced by his interpretations that at association meetings speakers often open their papers and close their arguments with an almost ritual-like appeal to the authority of his name.

At the same time he has barely won a foothold within academic psychology. His writings often confuse the reader by their lack of clear-cut, logical, and systematic organization. Instead of experiments from which to draw his principles he offers interpretations of living human cases, interpretations in which the evidence is often sketchy and in which there is an appeal to “forces” that have never been measured. And with very few exceptions, the laboratory has not been able to find a way to validate his theories, even where the attempt to apply rigorous controls has been made in sympathetic spirit. To a large section of the general public his theories have seemed not only fantastic, but nasty, bad, immoral.

Freud Disturbs the Sleep of the World

More than any other single factor, the impact of Freud's theories must be considered when the social historian attempts to explain the change in our attitudes toward the sexual life; and this fact, above all others, has been the source of his difficulties. For whether his theories prove correct or not, he put his finger upon a sensitive spot in the mores, and he invaded a shunned area, flagrantly violating a taboo that had been able to control even medical literature. He exposed to the light of day phases of sexual life that we had either denied, or hedged in with taboos, or covered over with the spotless cloak of sentimental moralizing. What he revealed was so flagrantly in opposition to official doctrine that his ideas were met by denials, ridicule, and contempt. It is hard to realize, at this point in the second half of the twentieth century, that obscurity, criticism, contempt, and even hatred, were the first fruits of these discoveries about the nature of human relationships. And yet, Freud consoled himself, if his theories were true, it could scarcely have turned out otherwise. That which we have repressed disturbs us mightily—arousing anxiety and violent protest when it is called to our attention. The modern Prometheus who tried to shed light upon our repressed sexuality could scarcely hope to escape the consequences.

A NEW VIEW OF PSYCHOTHERAPY

Trained as a neurologist, Freud joined forces with a physician named Josef Breuer shortly after receiving his medical degree. Together they undertook to treat nervous disorders, utilizing ideas the French students of hypnosis were also developing at that time, and adding certain unique notions of their own. Like the French workers, Breuer and Freud believed that the neurotic's symptoms were related to unconscious mental processes. Physiology and neurology were not enough: to be understood these symptoms had to be related to deep-seated instinctual tendencies, to repressed impulses; and once this relationship was made clear the symptoms took on meaning, fell into a comprehensible pattern. Set in motion by some traumatic event in the life of the patient, these hidden impulses were pictured as continuing in the unconscious mind, like a split-off mental system, repeatedly reactivated by those stimulations in the environment that resembled the original event which organized the unconscious system. These split-off systems tied up energies that could otherwise be invested in useful integrations, adaptations to real and pressing problems. The sensory and motor symptoms

brought by these patients were viewed as like the phenomena of post-hypnotic suggestion; the energy-system in the unconscious had simply captured the sense organs and the muscles, converting the unconscious idea into functional (behavioral) changes in the very tissues. This was the original conception of *conversion hysteria* which Freud and his associate proposed. And quite like the French, at that period, they also believed that there was a weakness in the mental structure of these patients, a tendency to dissociation, or splitting, similar to the dissociations produced under hypnosis. Placed under sufficient stress the integrative powers of these patients were easily surpassed, and the split-off systems responsible for the symptoms developed their unfortunate and independent powers of action.

In France, Pierre Janet had been developing his concept of *psychological tension* to explain these facts. According to this concept every person possesses a certain quantity of mental energy, or integrative power. This quantum of energy varies from individual to individual, and within the individual from time to time. Successful actions, rest, exciting emotions, and a hygienic regimen of living increase it; fatigue, exhausting and chronic emotional conflict, the shock of accidents and losses, the decline in our powers with ageing, disappointment, and defeat, lower it. Underlying this fluctuating level of psychological tension there was believed to be a constitutional factor: the inherited strength of the organism depending, in turn, upon the chemistry of our tissues, the structure of the nervous system. Stated in other terms, a high level of psychological tension enables the individual to withstand and recover from stress, to persist in building successful adaptations in the face of resistance, to organize and deal with the complex field of reality in such a way that the deep-lying needs of the person-as-a-whole are met.

When this psychological power is lowered beneath a certain threshold fragmentary action systems are free to act without their customary brake. Tics, contractures, paralyses, fits of absent-mindedness begin to appear; and a coordinated attack upon problems in the real world becomes impossible. Like a consultant called in to put a bankrupt business enterprise upon its feet, Janet learned how to review the patient's assets and liabilities; and he would then proceed to suggest the elimination of "costly" projects here, to advise modest and prudent investments there, all to the end that the quantum of mental energy and the total amount of integrative powers could be increased. The attack was made on all fronts. rest, suggestion, stimulating physiotherapy, medical "moralization" or exhortation, the liquidation of traumatic memories through hypnotic recall, re-education—in fact all of the therapeutic devices that the wit of the physician could summon to meet

the problem.² Since, on this hypothesis, there was no pre-judgment as to the cause of the lowering of the psychological tension, since hundreds of minor causes could summate their effects, analysis and treatment were many-sided. The purpose of any psychological analysis, any exploration of the unconscious, was more to reveal the nature of the dissociated systems than to uncover the cause of the dissociation. In Janet's hands the cure that was attempted was directed at a restoration of the integrative powers, at an increase in this psychological tension, and it was directed more toward the achievement of a rational plan of living in the future than in a review and assimilation of a past.

The Beginnings of Psychoanalysis

Breuer and his young associate, in Vienna, were also trying to reach dissociated complexes through the device of hypnosis, leading the patient to the point where he could name the name of that which was disturbing the integrated functioning of the mind. And they hoped, by means of a post-hypnotic re-synthesis, to restore the dissociated fragment to its proper and subordinate role within the integrated whole. A new concept was added to their theory of the cure, and it affected their procedures. Unless the patient could be made to *live through* the traumatic experience with the full intensity of its emotions, they felt that the hypnotic treatment would not bring about its full effect. This *abreaction*, as they called it, reminds one of an earlier type of psychological medicine in which the medicine man or priest endeavored to cast some alien spirit out of the individual, to produce a kind of psychological *catharsis*.

We express an analogous notion when we urge a person: "Go on. Have a good cry. Get it off your chest. An honest confession is good for the soul." And Breuer and Freud believed that there could be no externalization, no discharge of tension, without this full abreaction. It was as though the dissociated complex continued to go round and round because it was a truncated, frustrated act that somehow needed to be expressed in order to be terminated. Emotionally toned memory-complexes, called *affects*, were looked upon as something that had to be worked off, drained away. Frustrated, truncated, suppressed, they took their revenge upon the person by continuing to plague him; and if, as in the hysterical person, these affects were dissociated, they could no longer be corrected, dissipated, extinguished by those second thoughts that would redirect or tone down their force. The efforts of these therapists were therefore directed toward releasing these bottled-up affects.³

In 1895, when Freud came to Paris to study under Charcot and to visit

Freud and the Psychoanalytic Movement

the clinics of Bernheim and Liébault at Nancy, he saw at first hard confirmation of the theories that had been guiding him. On the whole, Freud seems to have been more impressed with the work of Bernheim. One observation struck him most forcibly of all: in the post-hypnotic period, when the patient seemed to have forgotten altogether what had transpired in the hypnotic seance, Bernheim could, by persistent questioning, finally elicit full recall. Evidently the dissociation was not complete. It appeared that the wall between the two halves of the mind, the conscious and the unconscious, could be penetrated *even in the waking stage*.

A second idea also lodged in his mind. Freud relates that one evening at a reception given by Charcot he heard the famous neurologist discussing a case with one of his colleagues. It seemed that a young married couple had returned from the Far East; and the wife displayed many nervous symptoms. He emphasized the fact that the husband was impotent, sexually. His colleagues could not see any important relation between the symptoms and this fact; but Charcot insisted, "In such matters there are *always* sexual factors, always, always." Always? Freud could scarcely believe his ears, for in his public lectures and in his writings Charcot had never referred to the sexual factor. What was the meaning of the conspiracy of silence?

For Freud this amounted to the confirmation of an earlier hunch of his own, confirmation by one of the world's foremost students of mental diseases. Some of the earlier cases he had studied with Breuer had contained evidence of sexual traumas, and with this new support Freud returned to his studies determined to search for this factor, even where the evidence was less obvious. He was ready to make a generalization, "*There is no neurosis where there is a normal sex life*"—a generalization that was to divorce him from the working partnership with Breuer and to call down upon his head the ridicule and contempt of psychiatrists for a generation.

His first discovery led to the complete abandonment of hypnosis. Utilizing the clue he had learned from Bernheim he sought to break through the barrier of resistance to the unconscious memories while the patient was fully alert. Though the material might come more slowly, he felt that it would be more completely utilized by an actively cooperating patient who could be shown the existence of unconscious motivations as they came to the surface.

Transference: Positive and Negative

Freud's path was beset with difficulties. There was the problem of the *transference*, the emotional bond that was promptly set up between patient and physician. He found that instead of taking his directions literally and realistically, searching for ideas at the fringe of his awareness, the patient

displayed a coyness, a dependence. The relationship was surrounded with an aura of affection-seeking; and there was a defensive, self-justifying, and even a hostile component that got in the way of an objective search. As Freud listened to his patient's conversations, he felt that they were placing him now in one role, now in another. None of the patients could take him simply at face value, as a professional helper, seeking simply to clarify the structure of motivations at work in the unconscious. They seemed impelled to fall in love with their analyst, or to rebel against him every step of the way, re-enacting (as he came to believe, finally) roles they, as children, had played out toward a mother, a father, or a sibling. It was as though the patient unconsciously misidentified the analyst, transferring to him attitudes that had arisen in a forgotten past. Some of these attitudes came from a fairly recent past, from the struggle of the adolescent with his parents. Some came from an earlier childhood when fantasies about the mystery of birth were still confused with the functions of elimination, eating. In a sense, with appropriately tuned hearing, the analyst could observe—as though in a museum exhibit—the whole history of the individual's development, and as he became sensitive to the significance of the play of emotional attitudes in his patient, he could lead the latter to see that it was "the child within him" that was distorting his approach to reality.

At first he found that this positive transference could be extremely helpful. Almost as one seeking to demonstrate his own good will and to win the approval and affection of the analyst, the patient brought forth memories, gained new insights. But like the child's earlier gifts of affection to his parents, these offerings also symbolized requests that could not be granted. The analyst could not be the conscience of the individual, taking over his moral problems and assuming the role of a permanent critic and guide. Neither could he protect, care for, and solve every one of the patient's problems, nor could he return the patient's love in the way that seemed to be required without stepping out of—and destroying—the physician's role. And with the patient's discovery of these limits to the therapeutic relationship the quality of his responses changed. A note of bitter disappointment, of hostility, entered. The first enthusiasm at therapeutic gains (and at the discovery of a new source of protection and love) evaporated; and there entered a note of complaint: complaint that no progress was being made, complaints about the analyst's excessive charges, his unwillingness to give, to help, and, most basic of all, about his lack of real affection for and interest in the patient.

Whether positive or negative, Freud continued to believe that the transference is the most useful single weapon of the analyst. It was only the apathetic, the withdrawn, the indifferent one who could not be helped. By

utilizing the forces of this transference relationship, whether those of love, hatred, rebellion, suspicion, he could bring the patient to an awareness of motivations within him—motivations that were producing his symptoms, motivations that had made him misidentify others, even as he was now misidentifying the analyst, motivations that had produced recurrent patterns of errors in his efforts to adjust to an adult world. The persistence, indeed the *fixation*, of an infantile self within him, had produced the recurrent pattern of errors in the patient's efforts to adjust to an adult world. Somehow he had to be led, as a more mature adult with greater powers of assimilation and understanding, to re-examine this infantile self and its fantasied products, thereby taking the first step toward completion of a growth process that had been arrested, and beginning the process of coming to terms with forces within him in such a way that they need no longer remain shut off, dammed up, working out their energy upon the very tissues, producing symptoms.

Overcoming the Patient's Resistance: The Use of Dreams

The second difficulty Freud encountered as he attempted to develop his "talking cure" was the barrier of *resistance*. With the best will in the world the patient, he found, could not turn back upon his own repressed past, seeing it with crystal clarity. In fact, the more he tried to cooperate in the search, the more apparent it became that the doors could not be battered down by a direct frontal assault. The attack had to be made indirectly. There was a counter-will, quite unconscious, that had to be circumvented.

Here Freud's experience with hypnosis must have been of assistance. There are *states* in which the disconnected memory systems are much more directly accessible. Hypnosis, sleep, and those twilight states between sleeping and waking seem most favorable. Seeking a substitute for hypnosis Freud began to utilize an extremely relaxed kind of recall which he called free-association. Lying on a couch, or leaning back in a comfortable chair with the analyst out of the range of vision, the patient was instructed to let his mind range freely, not censoring, not actively searching, but merely moving, as through a daydream. And the first rule, so easy to state and so difficult to follow, was a direction to this general effect: "Discard nothing that comes to the surface of consciousness. Accept the meaningless, the trivial, the indifferent, the nonsensical, the vulgar, the shameful. For the moment you try to select, to censor, to evaluate, the conscious portion of yourself, which has already shoved too many things into the background of your mind, will again outwit us, and the unconscious causes of your symptoms will remain hidden."

And Freud began to employ dreams. He was drawn to a study of dreams partly by their similarity to the mental processes found in a true psychosis. They are bizarre. They show the same quick shifts of direction that one learns to recognize in the speech of the schizophrenic. The latter jumps from one topic to another with obscure transitions that seem often to depend more upon sound than sense. And dreams are illogical, fantastic, even as the thoughts of the insane. Could it be that *they are also in closer communication with the unconscious?*

A THEORY OF DREAMING

When we think of those conditions that keep the unconscious from popping up, ordinarily, two things occur to us. The first condition is that set of demands made upon us by the present outer situation. We are bound by an ordered world of reality, we see probable and plausible things; and a framework of expectations for "things around the corner" regulates the course of our associations. And secondly, we are face to face with a world of persons—persons who evaluate, approve, censor our acts, persons who motivate our defensive mechanisms. The start that accompanies our sudden realization that someone has entered the room where we had been sitting, reading, imagining we were alone, is simply the shock of this controlling adjustment's coming into gear, this abrupt assumption of the mask and posture with which we face the world of persons. We have been guilty of nothing. Yet we start, almost as though we had been caught with our defences down. Be prepared, is our constant motto, even as it is with the Boy Scouts. Especially when we are in the presence of others! But in the dream, or in the solitary daydream, this censoring-defensive posture can be dropped. There is no one to spy. We parade in all our egoistic vainglory toward goals that we would blush to confess to our best friend. We indulge our dearest fancies, our shameful wishes. For as we fall asleep we loosen our grasp upon reality; the outer determinants of our stream of consciousness drop away.

A dream is thus conceived to be a poorly ordered fragment of thought which develops when the censoring, conscious portion of the self-system is in abeyance. In poor contact with outer reality those inner streams of motivation that spring either from "down among the cells" or from the unfinished business of the day assume control of the course of thought. For these reasons Freud seized upon the dream as the best avenue of approach to those hidden, inner, repressed, infantile causes of behavior. Stimulating the relaxed recall of the patient by presenting to him fragments of the dream which he had previously reported, Freud hoped that the patient would then be able to

penetrate that shadowy fringe just outside the field of the normal, rational, ordered, defensive, reality-bound awareness. Not only did he hope to widen this field of awareness and to improve the relationship between it and the dissociated fragments of the self-system, but he also hoped to catch those "basement children," the banished members of the household of the mind, exposed as it were, in their nakedness.

Again there were difficulties. Even as the hypnotic patient resists suggestions that violate his normal waking standards, the dreamer apparently maintains a modicum of censorship. Even in the dream the unconscious impulses do not appear in their undisguised and easily recognizable form. Instead, they disguise themselves, superficially viewed they are innocent, even nonsensical. But what had commonly been interpreted as a purely negative quality, and what had led most psychologists to discard the dream as an altogether worthless fragment of mental life—namely, its lack of organization and rationality—became, in Freud's hands, its most valuable quality. For, on his theory, the dream content which the patient reported had not assumed its form by chance, or merely because external and conscious controls had been withdrawn. The very absurdity of the dream (with its distortion, condensation, displacement, and its bizarre symbolism) is required if the dissociated and hidden impulses are *to express themselves and at the same time to remain hidden*. If the repressed wishes were to rise in their naked, disgusting, anxiety-inducing form, the dreamer would be startled into wakefulness, the censoring portion of the self-system would come back into gear, and the free play of impulse would be checked.

Thus the reported form of the dream is viewed as a compromise, a fusion of the wish-to-sleep, a concession to the remaining vestige of vigilance, an expression of the dissociated part of the self-system, a release in disguised form of the unfulfilled desires that are clamoring for expression and release. In approaching the dream of a patient, therefore, Freud assumed the role of detective, interpreter, seeking the true unconscious roots lying behind the disguised and distorted fragments that appeared upon the surface of the stream of consciousness. This surface content of the dream—the story told by the dreamer in the analytic hour—he called the *manifest* content. Behind this manifest content he sought the more important *latent* content; for, according to his hypothesis, these latent factors were the same ones that had been producing the symptoms of the neurosis.

The pathway to the latent content was not a simple and direct one. It had to be discovered, bit by bit, as the patient's associations to each fragment of the dream led backward to that earlier experience, and downward into the layers of impulses responsible for the formation of the dream-symbol. What

made the search difficult was the ever-present barrier of resistance, on guard lest the hidden be expressed. In fact, Freud came to suspect that even his raw material—the dream that the patient related—had already undergone “secondary elaboration” in the retelling, and that the reported manifest content was actually much more ordered, much more logical and rational, than the actual sequence of experiences in the dream. All through the search, even with the relaxed method of recall, and the permissive listening attitude of the analyst, the vigilant, logical, self-defending, reality-bound portion of the self-system was ready to deflect the course of associations as soon as they threatened to invade dangerous territory.

At this point we can begin to see the change in the quality of Freud’s thinking about the neuroses from that which his predecessors had suggested. Instead of a somewhat mechanical type of dissociation, due to a weakening or exhaustion of the integrative forces, the splitting off of a fragment of the self-system had been accomplished by a more purposive, more intentional kind of force. Love, hate, shame, disgust, guilt become contending forces, and the unconscious, which is thus actively repressed, in turn fights back, struggles to control the action systems, to gain expression. A dynamic, indeed an almost poetic and dramatic, account of mental life is substituted for the impersonal concepts of physiology and neurology.

An Example of Dream Interpretation

Franz Alexander reports the dream of a patient, and its analysis, as an illustration of the psychoanalytic theory of dreaming. The patient, a middle-aged business man had sought treatment in the hope of alleviating a depressed condition (including suicidal impulses). Early in treatment he reported the following dream: “I am taking a walk with one of the ranking officers of the Russian army and become aware that it is the Tsar. Suddenly a stranger appears with a sword and wants to kill the Tsar. I wish to intervene to save the Tsar, but it is too late.”*

When the physician offered fragments of this dream to the patient and asked for his free associations, *Tsar* produced “little father”; the word *officer* led to an account of some war experiences of the patient (who had served as an officer in World War I). In one of the lulls in fighting in which a truce had tacitly been agreed upon, and in which the soldiers of the opposing forces met and talked, the patient had violated the truce; and he commented upon the strangeness of this fact, since normally “he wouldn’t hurt a fly.” Even now he tried to justify the fact by emphasizing that the Russians had

* Franz Alexander, *Fundamentals of Psychoanalysis* (W. W. Norton & Company, Inc., 1948), p. 162. Used by permission.

been ruthless, had planned to kill the wives and children of their enemies.

The word *stranger* led, at first, to nothing. A prolonged blocking (which indicates to the alert analyst the operation of resistance summoned to repel a threatening symbol) led the analyst to hazard an interpretation. It was suggested that the stranger probably symbolized a strange (and repressed) portion of the patient's personality. After all, it was the patient who was managing the show in the dream, and the "little father" was killed. The patient was inclined to affirm that his own role had been that of protector; but enough of the interpretation had been accepted to arouse latent memories in which his own hostility to his father was quite apparent.

In the therapeutic relation with the patient this same hostility-toward-the-father had formed an undercurrent; and Alexander's efforts were directed toward revealing to the patient, out of his own dreams and free-associations, the earlier origins of this attitude in his own childhood. Moreover, the therapist had to bring the patient to see that when his release from military service had again forced him to assume responsibility for the direction of his own life, this ancient father-child relationship had been reactivated. Actually, his own father had stood between an indulgent mother and the child, striving to prevent the mother from spoiling him. This constellation of infantile tendencies had been reactivated by his real-life situation, and reappeared in his dreams and in his relations to the analyst.

drowsy student dreams that he is meeting his eight o'clock class while he sleeps on. The dreams in which thirst is gratified, or a full bladder emptied, give a symbolic release and at the same time permit the dreamer to continue sleeping. And the mechanisms of distortion, displacement, condensation, substitution, which enabled what Freud called the "dream work" to disguise sexual thoughts and to achieve a symbolic release in such a form that the relaxed censor is not alerted, fit the formula. But when the terrifying experiences of battle return in their frank and undisguised form, interrupting and undoing the processes of repair, of sleep, some other principle seems to be called for.

In *Beyond the Pleasure Principle* Freud took up these problems, postulating a new principle—a compulsion to repeat. In part this new principle serves the aims of the pleasure principle; for in rehearsing and repeating the scene of our defeat, the scene of the accident that caught us off guard, unprepared, the mind is able to come to grips with the event, to master it, to develop anticipations which—though filled with anxiety—reduce and channel the flood of stimuli that have proved too much for it. The speculations prompted by these cases led Freud far afield; and he came eventually to the conclusion that, opposed to Eros, to the life-creating and preserving sexual instincts, there were also destructive forces, a *death instinct*, whose one object seemed to be to reduce the living tissue to its inorganic components. In fact, with Eros pressing for growth and fulfillment, for the creation of new life, with a repetition-compulsion producing a round of "eternal recurrence," and with a death instinct that seems aimed at pain, destruction, death, Freud was now equipped with a set of "principles" that could explain (after the fact, to be sure) any trend in the course of events.

Applying Freud's logic to the anxiety dream, it could be described as:

1. Discharging, abreacting, releasing and dissipating the tensions created by the traumatic event.
2. Producing the experience of "masochistic pleasure," a release and satisfaction of the forces of the death instinct now directed against the ego, itself.
3. Disguising and symbolizing an aggression that is really directed at others, even as the suicide thinks, "How sorry they will be."
4. Developing the anticipations that will bind the chaotic impulses stirred by the trauma, preparing against the next occasion of surprise and fright, mastering the event that found us unprepared, inadequate, vulnerable.

This fourth value in the anxiety dream is one that is used by Alexander in his attempt to expound psychoanalytic theory. Reliving the scene of the ac-

cident may involve such thoughts as, "If I could only have thought soon enough to . . ." Just as we relive the scene of our *faux pas*, in reverie, and think of a dozen different things we might have done to extricate ourselves more gracefully and effectively from the predicament in which we were placed, so the anxiety dream is thought of as a kind of "undoing," as a rehearsal for possible fresh emergencies of a similar kind. Alexander writes as follows:

"The ego reacts to every invasion of the organism by excessive stimuli with an effort to reduce these stimuli to a constant level. It continues in its efforts as long as it does not accomplish this task. The traumatic dreams are manifestations of this relentless struggle of the ego to master a situation in which it has failed in the past."*

In the main the psychoanalyst looks for forbidden impulses behind the patient's wish to fall ill, the wish to be punished, the wish to kill the father—impulses that lead straight to a conception of infantile sexuality and to the concept of repression; for the basic conflict underlying the neuroses (as well as the split in the mind of the normal) is the conflict between the instinctual forces of the unconscious and that regnant part of the self-system which represses and curbs them. Thus the anxiety that appears in the dream may very well be a sign of the presence of a guilty wish. Not showing its own head above the threshold of awareness, the tabooed wish stirring beneath this threshold is known—nonetheless—by some vigilant but unconscious portion of the ego. The enemy is spotted before he appears above the horizon of consciousness; and the dreamer reacts with anxiety, expecting the worst and knowing, unconsciously, his guilt. This "worst" is usually a withdrawal of love, or some one of the many forms of "castration threat," which symbolize those conditions, real or fantasied, that made the child give up his earliest, incestual, autoerotic wishes—wishes directed toward his own body or toward the parents (especially toward the parent of the opposite sex).

Still active within us, these repressed infantile wishes stir forbidden fantasies, and the dream of punishment is a fitting denouement. The crime itself may remain below the threshold of awareness; only the distorted symbol has escaped the regnancy, the still vigilant ego. But since punishment is not only fitting but also tends to restore equilibrium to his troubled state of mind, it is willed; like a naughty child he is glad to get it over with and to resume good relationships with the parent figure. Punishment frees him from a continuing burden of guilt.

* *Fundamentals of Psychoanalysis*, p. 40. Used by permission.

A Note about the Art of Dream-Interpretation

The clinician who sits, hour after hour, day after day, listening to the dreams and free-associations of his patients, pursuing a single dream through several hours of analysis, picking up dream fragments and turning them back to a patient for his "stream of consciousness" comments, listening—as Theodore Reik puts it—"with his third ear"⁴ until the basic themes and the recurrent trends of a personality are insightfully grasped, both by patient and analyst, is about as near to the ancient oracle as anyone can be in our culture. His work is that of a super-artist who strives to portray in intelligible form the organization of trends in the personality—and to portray it, moreover, to the personality itself. When we realize that these personalities can be stubborn, defensive, fickle, changeable, submissive, that they are *adjusting* even as they are providing the facts, listening to interpretations, we realize how sensitive, how perceptive, this artist must be, and how *very* undogmatic.

This sensitive, perceptive, artist-therapist seeks to discover meanings, hidden purposes, echoes of an early infantile sexuality, where others see little but bizarre images. And he is a creative artist, too, since he seeks to bring about a rearrangement of the forces in the self-system, altering what—were it not for the patient's illness and his expressed need for help—we would call inviolable. From the glimpses of these interpreters at work one concludes that the analyst also moves with an intuitive understanding, with flashes of insight, directly to his interpretations. Although psychoanalytic theory tries to lay down the rules of the game, and to establish principles universally at work in all mental operations, the wealth of possible meanings, the admixtures of opposites in the principles themselves, the multiple striving (motivation) compressed into a single act, leave the analyst a very free hand. The apparent and somewhat mechanical facility with which some of the earlier reported analyses of dreams proceeded—analyses in which the content of a dream was assigned a symbolic meaning as though depending upon a "dictionary of dreams" rather than upon meanings which arise out of a unique history—indicates that the difficulty of the procedure was not at first recognized. Freud himself is not free from guilt in this respect; and he often urged that such universality of meaning in dreams depended upon the existence of a *racial unconscious*. According to such speculations each individual inherits, along with his organic structure, a pool of racial experiences, meanings. Tempting as such speculations might be to some, it should be remembered that—in this context—it is a rationalization for a mechanical type of interpretation that analytic experience itself now questions. Actually, the mean-

ings of dreams are neither simple nor obvious; and their interpretation is, of all psychological constructions, most difficult to validate.*

THE ANALYST AND THE PATIENT

Few psychiatrists of Freud's time were as sensitive to the interplay of forces between patient and physician. His isolation of the phenomena of transference, and his insistence upon the importance of analyzing and utilizing this powerful relationship in the healing of the patient's neurosis, was something new in the art of psychotherapy. The French had stressed a similar aspect of the therapeutic situation, under the term *rapport*. This was the relationship that must exist for good hypnotic work; it was the relationship that is enhanced by the trance state. But the French treated the problem somewhat mechanically, in comparison to Freud's approach. They regarded the state as an avenue through which suggestions work best, and they looked upon the therapist as an active agent impressing his suggestions upon a more or less passive subject, forcing the patient to accept his positive suggestions of health, of disappearance of symptoms, and the like. Freud, on the contrary, almost made a fetish of the permissive, non-interfering, therapist; the patient's associations were to be free, uncensored, and guided only by the repressed forces in the unconscious. The meanings of the symptoms (and of the symbols of the dream) were to be obtained out of the mouth of the subject, and by a method that enabled *his* needs (and not the view of the psychiatrist) to speak.

Yet Freud was a force, too—perhaps more of a force than he knew or would have cared to admit. His pupils found him unyielding and dogmatic; they were either forced to break with him or to remain completely in the shadow of his personality, completely in accord with his hypotheses. And when they broke with him, they soon felt the sharp edge of his analysis turned against them. When Adler left him Freud commented on his ambitions, pointed out the personal roots underlying the concept of the inferiority complex; and when Jung turned against Freud's great emphasis on infantile

* Actually, the psychoanalytic theory has never found experimental validation. What validity it has is obtained by the clinician and the patient in their collaborative efforts. Their procedures convince them, and if there is a successful therapeutic outcome, say, in 80 per cent of the cases, one might be willing to conclude that there is something about their procedures that has this 80 per cent validity. The disturbing fact, here, is the report that other therapeutic procedures operating upon the basis of quite different behavior-theory also report about the same frequency of successes.⁵

sexuality, Freud denounced the move as an attempt to curry favor with a public that had already heaped scorn and contempt upon the founder's head. One can see how, with the weapon of analysis, Freud could beat down every resistance of his patient. Either the latter became "converted" or he had to flee. Only those who submitted remained to give unqualified praise (or to figure as illustrations in Freud's report of his cases). Or so, in our own resistance to his dogmatism, it seems.

To his critics psychoanalysis seems to be a kind of Procrustean bed into which every clinical fact must be forced, with the lopping off of an association here, and the stretching out of a series of responses there, until all can be made to coincide with the limiting framework of theory. Logically, this is not a happy situation for any scientific theory. A theory, to pass muster in scientific courts, must be able to collect objective evidence under test conditions where *all* of the relevant conditions are controlled, so that its antagonists and those who are skeptical can be convinced beyond a shadow of doubt. This kind of proof and control is difficult to achieve in the analytic situation; and lacking these superior weapons, the analyst has turned the tools of his trade against his critics, treating every objection as evidence of resistance, of repressed hostility, as a form of defence against their own repressed sexuality, as evidence—in short—of the objector's neurosis. Did not Freud set the example by analyzing his doubting pupils? One of the uncontrolled variables in analytic procedures is the analyst himself; and he is strongly resistant to any contradictory insight.

Janet likened such analysts to the religious ones who say, "I have read the sacred books and find it all believable." And when they turn upon those who say, "I, too, have read them and find them full of contradictions" with the injunction, "Read them again with the eye of faith," it does not seem an adequate answer.⁶ It is an awkward state when the only ones who can validate psychoanalytic theory are those who operate under procedures and assumptions that involve complete acceptance of Freud's dicta.

Nor does there seem to be any easy way of testing the conclusions of the psychoanalyst. If we were to seek validation by taking the same dream material, the same patient, to two different practitioners who operate from different theoretical viewpoints, we meet the insuperable difficulty: when a subject has been led through several hundred analytic hours under the influence of one therapist (especially when he has been led to the point where he accepts interpretations), the patient is no longer the same patient. The second series of analytic hours would start from an entirely different point. A crude comparison (and that is the only kind available at present)

of therapeutic successes gained by practitioners operating under different theories indicates that there is little to prove that one is superior to the other. Each finds data that *illustrate* and *demonstrate* the hypothesis under whose guidance the data were collected. Each meets with failures, each with successes, and in about the same proportion.

There are, of course, numerous reports in the literature in which an analyst treats a patient formerly treated by another (who operated under a different theory). Having achieved partial relief from the first, and a specific diagnosis, and a particular sort of insight, the patient finds himself a year or two later faced with a recurrence of the same old symptoms. Freud reports such recurrences in his own patients, and—on occasion—uses them to indicate that his earlier work had been incomplete. The more common example found in the literature is the case where earlier interpretations are reported in order to show how utterly inadequate the theoretical approach of the earlier analyst had been, or how inappropriate his therapy. But these second reports usually follow too soon after the second and successful treatment. We await, with interest, the third report to come. As the matter stands, the evidence is contradictory; opposing theories find support in their ability to produce cures where others have failed; and no extensive and well-controlled comparisons, which would add the weight of statistical analysis, are now available.

Among American psychiatrists Harry Stack Sullivan has seemed, in his writings, to be most keenly aware of the difficulties in the analytic situation.⁷ Lecturing to his students, he pointed out that the very first words of the physician are of vital importance. His manner in receiving the patient, the questions he poses, are like challenges which organize the responses of the patient. Once the first responses have appeared, the second question is formulated; and, dialectically, between patient and physician the course of an interview develops. But the *beginning* must be watched with eagle eye, for in the turn of events at this point a whole series of *facts* is determined.

Thus the psychiatrist as interviewer must exercise the utmost care lest in entering the patient's psychological field he arouse the very tensions, evoke the very associations and "reasons," that he will later put down as facts. Until the psychiatrist discovers who he is, and what role he occupies in the patient's field, and what significant figures (from the patient's past) are now stirred within the patient—and he must be adept in doing this with *a minimum of interference*—he will be trapped into misreading as a characteristic of patient after patient a recurrent set of facts for which he and his method are directly responsible.

In response to such strictures analysts have sometimes retorted:

1. We do insist upon the novice in therapy undergoing analysis before he is allowed to practice upon others. Ours is the theory that has emphasized, from the first, the role of the analyst's own subjective conflicts.
2. The patient is tougher than you think. False interpretations (by the clinician) arouse resistance in the patient. He will bring dreams and associations that will confound and deny the hasty and false interpretation; and the course of therapy will not progress until the correct interpretation is found.
3. Both the course of therapy and the productions of the patient will serve to correct or to validate interpretations. Viewed in perspective the course of analysis contains a large amount of trial and error; but the success and failure in managing the tensions of the patient serve as an unfailing indicator.

The skeptic will note, of course, that the novice's analysis is made by one with definite theoretical predilections: it is both analysis and indoctrination. And the therapeutic success of rival doctrines leaves us convinced that there are therapeutic forces in the analytic situation that are not accounted for by the particular forms taken by the theory. And the skeptic, realizing that the whole structure of psychoanalysis was arrived at through a method that made dream-interpretation the key to the structure of the self-system, will want to keep an open mind about its validity. It is to the more detailed analysis of this theory of development that we turn in the next chapter.

REFERENCES

1. William McDougall, *Outline of Abnormal Psychology* (Charles Scribner's Sons, 1926), p. viii.
2. See Pierre Janet, *Psychological Healing*, 2 vols. (The Macmillan Company, 1925).
3. Freud (in collaboration with Josef Breuer, 1892) "On the Psychical Mechanism of Hysterical Phenomena," *Collected Papers*. Vol. I, pp. 24-41 (Hogarth Press, 1949).
4. Theodore Reik, *Listening with the Third Ear* (Farrar, Straus & Co., Inc., 1948).
5. Leland Hinsie, *Concepts and Problems of Psychotherapy* (Columbia University Press, 1937), Chap. V.
6. Janet, *Psychological Healing*, Vol. I, p. 634.
7. Harry Stack Sullivan, "The Study of Psychiatry," *Psychiatry*, 10 (1947), pp. 355-372.

CHAPTER 20

The Psychoanalytic Theory of Development: The Oral and Anal Stages

Early in his practice Freud developed a group of hypotheses, partly borrowed, partly new. He looked upon the symptoms of the neurotic patient as meaningful expressions of ideas of which the patient was wholly unaware. These unconscious ideas, dissociated from and inaccessible to the conscious ego—that introspecting and executive portion of the self-system which plans and releases voluntary activity—were viewed as implanted by some earlier trauma, some shocking, terrifying, or shameful event, which could neither be assimilated nor discharged. Round and round they churned within the unconscious, sometimes forcing the ego to use some of its energies in repressing what was both unpleasant and threatening. Thus the “executive apparatus” was robbed of energy that could otherwise have been devoted to productive pursuits. Sometimes the energy bound within these repressed systems was great enough to break out into symptomatic acts which the ego could watch, but for which it had little explanation and even less sense of ownership. Along with these historical causes of symptoms Freud added the conception of a constitutional weakness, a tendency toward splitting, a deficiency in integrative powers; like many of his contemporaries he felt that the neurotic was genetically different from the normal. Although this concept of a constitutional weakness is somewhat vague, it has persisted throughout the study of the abnormal; for—the clinician argues—are not the normals subjected to every one of the traumas reported by the patients

without succumbing to neurosis? These normals withstand the impact, accept and profit by experiences, continuing their growth to maturity.

Had Freud stopped here his theory would have had little to distinguish it from those held by his contemporaries. Certainly the French had long taught this role of the unconscious idea. For Bernheim the culprit-idea had been implanted by suggestion; and, proceeding upon this theory, he sought to implant counter-suggestions that would nullify and counteract the effect. For Janet the dissociated system had been split off from the rest of the mental apparatus by forces that lowered the integrative powers. This lowering of integrative force he traced to prolonged mental strain or acute emotional shock. And, like Freud, he conceived of a constitutional factor: these were the "fatigables," the easily exhausted ones, those whose original endowment of integrative energy was insufficient.

Freud's unique development began with his discovery (or assumption) that *all* hysterical symptoms arose from sexual traumas. Others had accepted the notion that an emotional shock arising from the sexual sphere might be enough to precipitate a neurosis in one so disposed constitutionally. Others had also pointed out that the periods of puberty and the menopause are times when the person is most prone to develop psychological abnormalities. And it was commonly believed that hysteria was sex-linked; only women were thought to be subject to it. But each of these facts was given a biological, rather than a psychological interpretation: changes in the energy-system and the appetites, the stresses arising from the forced learning of new adjustments, the physiological changes of the menopause, the constitutional weakness of the susceptible sex, and so on. Freud was the first to assume that the psychological aspects of sexuality were the sole cause of the splitting of the mind. Subsequently he was to correct his early oversimplification; and he ultimately modified his notion of sexuality to such an extent that it was scarcely recognizable as sexuality to anyone equipped merely with the ordinary usages of language. However, the direction given to the development of his theory by this first assumption laid the groundwork for the construction of dozens of secondary hypotheses. That, and the further notion that he had raised to a central position in his analytic technique—the notion that the events of the dream are somehow closer to the unconscious processes. He continued to look upon the dream as an expression of the split-off and repressed system that was causing difficulties in real life. In searching for the deeper sexual meanings of the dream he felt that he was on the trail of the root cause of the neurosis, of repression, of the failure of the individual to mature to a happy and productive form of living.

The search for sexual traumas began quite simply; and the analysis was

carried back, naturally, to puberty. Who would think of exploring further? Yet, in spite of patient search and occasional successes, there were many patients whose post-pubertal psychosexual life had been objectively uneventful. Their dreams revealed nothing noteworthy—on the surface—and throughout the search the patient continued to deny the existence of a sexual problem, opposing the tentative hypotheses advanced. What to do? A less stubborn man, or a less courageous one, would have abandoned the original hypothesis. But the challenge of negative instances suggested, to Freud, secondary hypotheses; and he redoubled the intensity of the search. *Cherchez la femme*, indeed! *Cherchez la cause sexuelle!* He revised sexual theory, calling attention to numerous overlooked (or repressed) evidences of sexuality in infancy; and by his theory of dream-work, together with his system of dream interpretation, he found that he could link virtually any dreamed-of event with the sexual aspect of behavior. Did the patient dream of searching for treasure in caves, of climbing the Eiffel Tower, of going through the rooms of a house, of a fountain pen that would not write, of delivering a lecture when he was unprepared? A sexual meaning could be found for it, and a meaning, moreover, that harked back to infancy for its roots, to an infancy when the child's first expressions of sexuality were directed upon his ego, upon his own body, or upon his father and mother. By its own traumatic force this aspect of Freudian theory so challenged the mores and the beliefs of the men of his generation that it became the central issue in psychiatric congresses. No doubt he won some converts by the very enormity of his departure from the accepted views. He also seemed to offer an avenue of escape from the blind-alley of hereditary theories; for his conceptions of infantile sexuality now offered a plausible explanation for later susceptibility to shock. It was an explanation, moreover, that seemed to carry with it the ultimate hope of doing something about the patient's symptoms; and it promised a new regimen of child training, which would reduce the incidence of neuroticism.

As his studies advanced he turned his attention to earlier stages of childhood, at least as these were revealed in or implied by the dreams of his patients. And from this reconstructed childhood he proceeded to probe still earlier stages of infancy. The events unearthed at each period seemed to call for hypotheses about an earlier past. Today some of his followers have pushed the quest back to the prenatal period. Birth became for some, the *great* trauma. Thrust from the "easy life" of the foetus, the individual entered the world of threats and tensions, wailing, the trauma of birth had laid the foundation for later neurotic development. (That no difference could be found between the babies delivered by Caesarian section and those born

normally—and the added fact that this trauma is indeed very widespread—did not seem to deter these speculators.)

Thus, from the sexuality that dawns at puberty Freud expanded his survey to include those forces in the fertilized ovum *Eros* became a type of energy existing in every differentiated cell of the body, a life force operating on the pleasure principle, and having as its true aim the reproduction of the species through union of the sexes. Even the self-preservative instincts became, to his way of thinking, subordinate components in this all-embracing force. And from sexuality as a conception centering in the genital acts involved in intercourse, he went on to include all types of pleasure. The act of nursing was viewed as one of the first “sexual” acts, the act of elimination was viewed as “erotized,” as providing an anal pleasure. The pleasures arising from the skin and muscles were also viewed as erotic, as variations in the single pleasure-seeking theme. Thus when the pleasures of the senses dominate the life of the individual, Freud was prone to regard this “narcissism,” this self-love, as evidence that the sexual instinct had remained fixated upon the ego, and in a pre-genital form. When hysterical symptoms affected the eyes, Freud remembered the Peeping Toms, and the role of vision in the fore-pleasures of the sexual act, and the power of visual stimuli to excite the sexual apparatus. He looked upon a hysterical loss of vision as evidence that the individual, in his struggles to come to terms with the sexual problem, had repressed both the sexuality and the visual function that was a part of it. Thus it was that kissing, smoking, eating, bathing, dancing, swimming, defecating, urinating, smelling—almost every activity could be made to yield an erotic component. With these extensions it became easier to view any life history *sub specie sexualis*. The libido, or life force, pervaded almost all behavior. What could thus be linked with sexuality was viewed as *driven* or controlled by this libido.

From the resistance of the patient, and from his unconsciousness of sexual traumas, Freud developed his concept of repression. The forgetting, the splitting of the mind, was no mere neurological accident, no severing of the connections of an action system through mechanical shock (as some had supposed, for example, in their effort to understand the appearance of symptoms following a railway accident). Nor was it due to a mere weakness in the integrative powers, as Charcot and Janet had seemed to teach. In Janet's view this weakness was like that of the weary accountant who can no longer attend to and integrate into one purposeful whole the mass of figures lying before him, when he has worked too long and too late on the task of striking a “trial balance.”

No, it was a more purposive thing than that. The ego—operating on the

pleasure principle—banished the repressed thought. Prompted by the instinctual forces residing down among the cells, the sexual thought threatened to destroy the peace of the ego-economy, conflicting with other needs, with the mores-determined and parentally taught standards of what constitutes the Good Person, and—most important of all—with his own need to be loved. Bringing in its trail anxieties and threats to security, this thought is nipped in the bud. It is as though, knowing the consequences of its expression, the ego now confines the culprit-idea to its sub-cellular existence. But if such repression was automatic, immediate, involuntary, it was also purposive and adaptive. It was adaptive in the sense that it preserved the conscious ego from pain and tension that could not be borne. The repressive counter-force seals the hatches of the mind. Like some fuse that “blows,” breaking the circuit, defensive mechanisms of the mental apparatus never allow the mounting tension to pass beyond a certain point. Only “samples” of the banished impulse get above the threshold, and these are apt to be distorted symbols, symptoms, slips of speech, errors in the execution of voluntary acts, prejudices and preferences whose full meaning is never apparent to the ego. And, on this theory, the waking ego, preoccupied with its interests and concerns during the day, can maintain repression; but when it is relaxed, in sleep, with no outer world to support its control over the coursing unconscious impulses, the ego permits these repressed impulses to enjoy a greater freedom. Even here they are disguised, and the symbolism of the dream will require extended study and interpretation before that which has been repressed is finally understood.

One more of the secondary hypotheses needs emphasis. Searching for sexual traumas Freud found dream material that, under his manner of interpreting, indicated a surprising number of incestual thoughts, of references to seduction by parents or relatives. And he found that in the dreams of his patients parental ogres displayed indifference, hostility, severity, which the objective facts—reported by the patient and his relatives—did not support. These dream-facts, he came to believe, referred to fantasied seductions, fantasied rejections; and as his search centered more and more upon infancy, his findings could be summarized in the form of a generalization: “To know the real life of the patient is not enough; we must discover the fantasy life of an infant, of an ego just emerging, a weak ego driven by the powerful and archaic force of instinct, an ego with—as yet—very little grasp of reality.” Terrified at what it *interprets* as threats of loss of love, confronted by learning tasks that easily overwhelm its tolerance of stress, this infantile ego arrives at fantastic conceptions and solutions. And the implications developing from these solutions may require such an investment of energy (either in

the striving to achieve fantasied goals or in the repression of impulses that have direful consequences) that the whole forward-going process of development is twisted or arrested. Even where childhood seems to pass over serenely into adolescence—as long as it is under the protective arrangements of the home—when the biological clock finally strikes (at puberty) and instinctual forces reach a crescendo, or when the sociological clock signifies that it is time to marry, to establish a home and a career of one's own, and to assume responsibility for one's life, then the rifts in the personality structure, established in those earlier infantile attempts to master a fantasied world, return. The seam within the personality grows wider. Impulses that should now function freely are locked in the limbo of the unconscious; and the ego, which should be free to face the world with all of its energies, is too much involved in keeping anxiety-inducing impulses below the threshold of awareness. And this misguided repressor who had to solve too-difficult tasks too early, this infant that we were, still lives within us. He lives in the structure of the self-system that was set up then, in the relative balance of the forces between the regnancy and the banished impulses. Strong egos can distribute, utilize, and find satisfaction for the instinctive needs arising down among the cells. Weaker egos cling to the partial and inadequate solutions of infancy. Indeed they appear to go back, regressing to the point where an at least tolerable solution was once found, seeking dependence, proofs of affection, struggling to maintain the appearance of being an infantile kind of "good boy."

Thus a mental illness came to be viewed, in Freud's developed theory, as a failure to grow up, a fixation upon infancy, a resurgence of infantile solutions, a return to an infant-parent relationship of an earlier period, a regression to infantile wishes and solutions. In a sense this infantile self is never left behind. It continues to live within us and it is more real, more powerful, than we had thought or than the thin veneer of civilized adulthood had permitted us to see. The occasions that precipitate a neurosis merely activate the fears and wishes of the infant-within-us. Whatever intensifies these wishes, or whatever weakens the resources of the repressing ego, merely brings out into full expression what infancy had long ago established. Our rationalizing, our endeavor to maintain a façade of civilized adulthood, become transparent when the experienced analyst listens to our dreams and associations with that "third ear" of Freudian insight. The search for the sexual trauma now becomes the search for the infant within us; and under the theory of transference this becomes a re-experiencing, with the analyst serving as parent-surrogate, of all of those primal conflicts that first gave form and structure to the self-system.

THE PSYCHOANALYTIC RECONSTRUCTION STAGE BY STAGE

Beginning with the adult suffering from a neurosis, guided by the major theoretical constructions he had introduced to bolster his original hypothesis, Freud probed farther and farther into the infantile origins of abnormality. He emerged, finally, with a concept of the total course of development which could be stated as a genetic account of the maturing self-system. His studies, be it noted, were not directed primarily upon the neonate, the infant and child, and then—finally—upon the adolescent and adult. He entered the drama at its very climax, when the self-system threatened to break up. His reconstructions are therefore to be viewed as similar to those of the archaeologist who, from flints, potsherds, and fragments of inscriptions, tries to reconstruct a civilization. Or they might be viewed as similar to the work of a historian who, like Toynbee, tries to make sense of the whole story of civilizations, seeking recurrent patterns, a rhythm of events, an essence of the human predicament, *after the fact*.

In view of the fragmentary character of his knowledge, and in view of the magnitude of the task, the final reconstruction of the analyst has to be viewed as the work of the philosopher-artist. This drama of human development is what the poets, moralists, novelists, dramatists, have been trying to depict for centuries, from Euripides to Franz Werfel, from Homer to T. S. Eliot, from the apostle Paul to those of our own time who attempt reconstructions in theology. It involves us in the study of the individual and the culture, the organism and all of its learnings, the family and the larger society. Though Freud could weave his story around the hard facts of his clinical experience, the subjective predilections of the philosopher-artist, as well as the currents in the culture, loom so large that the product must be viewed as metapsychology, as prolegomena to a scientific study of development, rather than as the outcome of such scientific study.

It is more than this, as anyone who has counselled young adults can testify. For the new view has entered into the actual procedures in handling children, by now, to such an extent that we can truly say, "The word has been made flesh." For, today, some of the patients who enter the clinic are the children of parents who have themselves been analyzed and who have endeavored to apply their analytic insights in discharging their responsibilities as parents. These patients were guided by Freudian insights—as their parents understood them—and now they come seeking help for ills they have already diagnosed in the light of psychoanalytic theory. A theory of human

development, when it becomes widely disseminated as a part of the culture, affects human development itself.

The fact that some of these "psychoanalytic children" find their way to the clinic does not, of course, prove that the theory given to the parents was false. Perhaps they misunderstood it; or, being human, were unable to translate its best insights into action because of their own inner barriers, repressions. Or, circumstances quite beyond their control may have produced effects they would have avoided had they been all-wise and completely free agents. And the analyst of these parents was also human, forced to work with recalcitrant human materials of various strengths and weaknesses; and he may not have been able to impart the theory in such a way that, in becoming flesh, it led to the full maturing of the patient to the point where he could function as an effective parent.

In any case, we shall look at the over-all account of development, the summary of the reconstructions Freud made from his analyses of patients, viewing it as a partially documented hypothesis, a provisional way of looking at the voyage from birth to maturity.

THE ORAL PERIOD

The Instinctual Forces Underlying All Behavior

In the beginning is the ID. This "it"—and the name was chosen because of its very emptiness of meaning—can be viewed, logically, as the re-ified cause of a galaxy of functions. Call it the sum of the instinctual forces that drive the mental apparatus, call it a quantum of energy with which the individual is endowed, call it all the tissue needs and place its ultimate origin down among the cells where hunger, thirst, aggression, sexual appetite, and all the defensive and protective strivings dwell, and you will have a name for the total push behind development. Logically it is little more than a postulated cause for the acts we see, a kind of imagined reservoir of force to which we can make reference when the act appears. Behind the actions we view we are prone to place an energy, a restless force striving to express itself in just this particular way. If a critic wished to be unkind to the psychoanalytic view, he could compare Freud to Molière's oft-quoted physician who explained, soberly, that the sleep-producing property of the opiate lay in its *soporific tendency*.*

* Freud lapses into this type of thinking frequently. Compare his explanation (?) of the dream as motivated by the wish to preserve sleep. This desire to go on sleeping would be one strand of the id-contained force.

Freud clearly belongs to the animistic tradition. The mental apparatus resides in the nervous system, we are told, and in the "deeper layers" of the latter the *id* resides. This *id*-energy stream can flow out into actions directed upon the outer world or upon the bodily tissues themselves. Dammed up, frustrated, denied expression in normal channels, it then is forced to vent its energy upon the ego, upon the body. Does not the acid secreted by the cells of the stomach lining sometimes attack the mucous lining of the alimentary canal itself? Does not the finger of the suicidal person who pulls the trigger turn *id*-energies upon their very source?

Whether the energies flow inward or outward, whether they build up or destroy, reducing the delicate and unstable organization of living matter to the more stable forms of its inorganic component parts, they *flow*. Life is a striving, purposing, forceful thing. This is the central core of Freud's construction. In various places he has tried his hand at localizing this *id*, but his speculative neurology is an indifferent sort of thing. At one time he would have us localize the *id* in the deeper levels of the nervous system whereas at other times he has spoken of it as though it were a force that resides in each and every cell. Each organ would then be endowed with its share of the *id*-energy. Since the hypothetical force of the *id* is never measured save in the actions that come forth, we can pass over this point. All of the criticisms levelled at an instinct-psychology when, in the 1920's, American psychologists made a concerted attack upon the concept, can be levelled against this psychoanalytic construct. We can look, and pass, realizing that the genetic account of development is founded upon a pseudo-biological concept which re-ifies observed trends in behavior and provides a pseudo-explanation for their persistence, force, recurrence.

When Freud first described behavior in this language of forces, strivings, instincts, he was inclined to speak of a life force—a vital principle that was creative, constructive, productive, pleasure-seeking—and he named it *libido*. But as he continued to study his patients he found a savage destructiveness in them, a delight in smashing, killing, hurting, which he felt could be no mere secondary by-product of the thwarting of the creative urge. It was, itself, a primary force in its own right. Thus the *id*-stream was made to contain forces both red and black, forces of love and of hate, creative life instincts and destructive death instincts, *libido* and *destrudo*. If he had needed extra-clinical experience to convince him, World War I (1914-1918) would have been enough; and in his "Thoughts for the Times on War and Death" (1915) he emphasizes the war's revelation of the dark forces at the very center of man's being.¹

We had hoped for too much, Freud says, and in our pious enthusiasm and

hopeful optimism had drawn a picture of man too pretty, too civilized, too cultivated, to be true. At least, we had said, man's original nature is neutral. He is not *originally* hateful, destructive, criminal. So we had said. And we were inclined to add, it is only a bad society that has warped him.

This notion, Freud said, in effect, is a tale for the nursery. The fang and claw of our animal forbears are still a part of us, and our unconscious contains the forces that have always driven this fighting apparatus. Like gill slits and the vermiform appendix, they reveal an inherited past, but unlike these vestigial analogs the death instinct is still a central force in the self-system. The unbridled aggressions revealed in the dreams of civilized patients—impulses that sometimes break through into overt behavior in the homicidal paranoiac, impulses that seek to destroy the self of the depressed patient—all go so far beyond the rationally conceived needs of life as to argue for the existence of a primary destructive force in man, a force requiring its own unique satisfactions. So Thanatos was enthroned beside Eros, death beside love, for the aim of the death instinct is to return the organism to its former inorganic state. It is not merely that death is the natural terminus of life. There is also a striving toward this end.

Biologically man is still a half tamed, half civilized creature. Love and hate contend within his breast for mastery. Some of Freud's successors have speculated about the relative strength of Eros and Thanatos, about individual differences in this matter. But since no independent measure of these forces is possible we can see that, like the primitive medicine man, the psychiatrist who follows these constructions can only say, *after the fact*, that Thanatos was stronger than Eros *in this patient*. Did not the suicidal end of the patient's life demonstrate the superior power of the death instinct?

Unlike some of his contemporaries, while he was generously providing an instinctual underpinning for the actions that would later develop, Freud could find no place for any instinctive force driving toward goodness, or perfectibility. There were constructive aspects to Eros, to be sure, but its aim was that of the preservation of the species, the union of sperm and ovum, the continuation of life. Freud wrote:

"There is unquestionably no universal instinct towards higher development observable in the animal or plant world even though it is undeniable that development does in fact occur in that direction. I have no faith in the existence of any such internal instinct and I cannot see how this benevolent illusion is to be preserved."*

* From *Beyond the Pleasure Principle*, by Sigmund Freud, p. 55. Copyright 1950, Liveright Publishing Corp.

On the contrary, wherever he looked out upon the social scene, he saw society forced to hedge in the forces of instinct—developing taboos against incest, aggression, taboos against immoral and anti-social conduct. Why should our punishments for transgression have to be so severe, if it is not that the opposing forces are equally strong? By their very nature and strength the laws of our land reveal the shape of that which must be restrained. Thus the id is conceived to be a perverse, bestial, incestuous, polygamous, destructive, stealing, loving, hating force. Creator and killer, in his actions man gives outward expression to this inner battle between Eros and Thanatos; these forces create the patterns of action we see as they come to terms with the society that rears barriers against their free expression. As for the id itself, it is polymorphous, unshaped, impulsive, unreasonable, inconsistent, lustful, tender, fearful. Like a gaseous cloud it contains all shapes. Romantic and somewhat mysterious as this conception of life is, Freud was never willing to be caught out with a too optimistic conception of the outcome of the struggle of these underlying forces. No Rousseau or Kropotkin, he; rather, as a hard-bitten clinician who had learned to peer through the mask of defensive reconstructions that make up the *persona* (the outer garment that we wear to conceal the ugly contours of the self), he was content to study the crude and lusty forces that respect neither logic, convention, nor morality.

The Oral Component of the Id

In the growth of the child the psychoanalysts have attempted to mark off certain roughly defined stages, each stage marked by the dominance of id-demands arising from particular organ-systems. Here we find an illustration of the theory that each organ system carries a portion of the id-energy. We shall also see that this energy can be both creative, life-giving, life-sustaining, and aggressive, destructive, hostile to the self and to those about him. Around these cores of id-energy, character takes shape as the energy comes to terms with reality; and finally, out of the competition of organ-systems an organization of forces emerges and assumes control over the effector apparatus.

In the beginning the child's activities are dominated by the mouth zone, a mouth that seeks, nurses, bites, tastes, wails, coos. The mouth is ready to fasten upon the breast, to gnaw fingers and fist, to sample every object within its range. Hands and eyes soon come to serve the mouth. As the leading segment in the bodily economy it organizes action patterns around itself: it seeks pleasure, incorporates, attacks, expresses aggression, spews out its contents in rejection, cries out its rage or fear. The id lives by the mouth, expresses itself by the mouth, develops skills via the mouth. The first con-

sciousness of the world is a mouth-consciousness; and the first organization of the self is an oral ego

Or perhaps we should say that the first encapsulating layers of the self-system, the first protective shell around the id, are laid down in a form determined by mouth-demands and by the nature of the reality the mouth is up against. If, following the analysts, we call the mouth an *erogenous zone* we are merely indicating the fact that this zone gives rise to pleasurable sensations. It is the first channel through which the libido (the Eros portion of the id) is satisfied. The child's first love-needs are expressed by way of the mouth. But, while we are calling it an erogenous zone, we should also remember that this is the first channel for angers, hungers, disgusts, fears. It is a destructive zone, too, biting the nipple that thwarts, or crying in anger at any interruption of its satisfying nursing experiences.

Imagine having to know the world solely through the mouth, to sample the personalities about you by mouthing them, to have to wait for the consent of the gustatory and tactual qualities that arise from the mouth zone before executing the acts of acceptance (incorporation, sucking) or rejection (spewing out, rejecting, averting). Yet this is virtually what the infant has to do. The severance of the umbilical cord cuts off the chemical sources of energy in the mother's blood stream; and the mouth must attach itself periodically to her body to renew this stream of nourishment. Indeed, her body—and the breast in particular—is the infant's first object, and she, as the purveyor of nourishment, as the one who releases the mouth-zone tensions, becomes the primal person.

Out of these interchanges between mother and child grows something more than an identification and discrimination of the first *other*. Affective attitudes are generated, basic emotional tones toward the world are established. If this first object is the breast-that-fulfills, and if the mother's arms are supportive, cuddling, tension-reducing, an attitude of confidence and trust and pleasure, an expectancy of successful contact, is built up. At least the roughly differentiated core of such attitudes is built; and the first encapsulating layer around the id, the oral ego, could then be said to be on good terms with the id. With this kind of start, whenever hunger arises it will be expressed promptly and vociferously, and with expectation of satiating contact. In between these hungers the child can be placid (without any persisting residue of tensions arising from frustration). And when his hunger arises again it will not be a threat, a source of anxiety; nor will his cry be fretful and full of expectation of "another time of stress."

If, on the contrary, the breast is the object-that-denies, teases, frustrates, that is altogether uncertain; if the formation of the nipple or the mother's

supply of milk is inadequate; if the schedule of feedings is poorly timed or so rigidly fixed as to fail to conform to the pattern or rhythm of the infant's needs—then the oral base of the self-system is filled with anxiety, uncertainty. Depending upon the strength of the infant's own powers and the severity of the frustration, the id-demands will then carry with them either a strong component of aggression, biting (feeding with hate), or they will be fused with fretfulness, indigestion, anxiety. In extreme cases what amounts to complete loss of appetite, apathy, and withdrawal will occur. When the id-energies are too consistently thwarted the child fails to establish normal contact with or interest in the outer world. He is hard to arouse, slow to develop. It is as though the id had turned away from a chronically thwarting and unmanageable world—as though, failing to renew its strength through the mouth channel, the very source of impulsive striving had dried up.

So the theory runs; and pediatricians and parents, impressed by the authority of the psychiatrist,* and fearful lest in their mishandling of their tiny charges they plant the seeds of future neurosis, have designed a pattern of indulgent infant care calculated to strengthen this first layer of the self-system.

The oral component in the adult character is thus conceived to be as variable and complex as all those relationships with significant persons in the early oral period. How it will be overlaid, neutralized or nullified by later experience will, of course, depend upon subsequent history, upon the roles the individual learns later to play. Whether in later years this first oral component will be reactivated so that the individual seems to return to earlier infantile attitudes toward the world will depend both upon the strength of this subsequent superstructure as well as upon the kinds of press it is subjected to. There is an assumption, however, in psychoanalytic theory, that this oral component remains what it was at the time it was laid down in the infantile period; and the theory assumes that this oral "layer" of the character-structure continues—even though it is largely unconscious—as unchanged and unvarying as the grooves in the phonograph record.

The So-called Oral Character

The oral character is a type of organization of the adult self-system showing a dominance of those attitudes and action systems that are normally most appropriate to the early period of infancy, when the mouth zone properly

* Psychiatry is an area broader than psychoanalysis. Many psychiatrists use methods (e.g. shock-therapy) quite different from the one originated by Freud, and some of them treat disorders (e.g. organic psychoses, dementia paralytica) to which psychoanalysis is not applicable. Some psychoanalysts differ from Freud—in details of theory and practice—but it would seem incorrect to use the name unless we wish to indicate a basic agreement with Freud's system.

leads in the orchestration of behavior. These infantile themes continue to dominate the behavioral equipment as though the individual's development had somehow been arrested at this early period. We have all seen, in our friends, this tendency to hark back to some segment of their life. We see adults who—like the old pioneer who continually refers to “when I drove stage”—dwell upon the good times of their adolescence, their childhood on the farm, their college days. Freud thought that he found patients, in the clinic, who were arrested at the oral period.

Yet when we search the analytic literature for a precise meaning for this concept—the oral character—we find that there is not one oral character but many, as many as there are ways for an infant to handle his needs. The causes for the arrest are mixed and variable, and the outcomes are just as diverse. Perhaps the most generally accepted view is that with complete and satisfactory gratification of the oral needs (and therefore with a minimum of frustration) the child will pass through this period to the subsequent ones without any arrest, without any residue of oral cravings. He will not continue to compensate for anticipated rejections and frustrations of the mouth-zone; and he will not withdraw, hate, envy, fear, or experience oral anxiety. Nor will he give expression to his dependent and aggressive impulses by mouth-zone activities. Instead, he will have a warm attitude toward others, a realistic appraisal of his world, an air of confidence, of gratification-expectancy; and the forward-going, creative forces of growth will permit the normal interests of the next period to assume control. He will be able to vary his approach to problems in accordance with the strength of other needs and the objective character of the situation. He will be able to persist, to combine and recombine his action tendencies, to set goals ahead, and to order and control his own need-systems. He will be able to play, to relax, and to show a high frustration tolerance. Thus the absence of chronic threats, the absence of undischarged and unsatisfied mouth-zone tensions, the absence of traumatic experiences arising from situations that push an immature organism beyond its limits of tolerance and understanding, leave the positive forces of growth free to carry the child forward to a normal maturing. So one generally accepted version of the theory goes.

Yet there are limits to the gratification-logic. The studies of Dr. Levy on overprotection (see page 216) as well as the second thoughts of common sense assure us that the complete emphasis upon gratification would be one-sided, however appropriate it is for the earliest and most helpless period. Sooner or later the child has to be weaned, and too prolonged nursing gratification overemphasizes and fixates the oral-zone dominance as effectively as frustration. Sooner or later the mouth zone has to learn to wait, to have re-

gard for the schedules and needs of others, to tolerate reasonable frustrations. These transitions should be gradual and paced to the tolerance of the child. An ever-widening set of interests and satisfactions mitigates the dominance of the oral cravings; conversely, thwarting of this more general development throws the individual back upon the oral satisfactions. If the training of these mouth-zone tensions has to be done with respect for the basic cravings, the management of development must be with a view to subordinating the craving of the segment to other needs of the person as a whole. It is a matter of pacing, and balance.

An Impressionistic Evaluation of the Analytic Theory of the Oral Period

Since we do not have the longitudinal studies, extending from infancy to adulthood, required to validate the analytic hypotheses, there is little with which to oppose them except our general sense of the dynamics of development. The analysts, themselves, find validation in their special methods, but the process of interpretation of symptoms and dreams is itself so open to question that the need for more objective proof remains. Even as we try to think of what would be meant by "objective" proof, however, the task seems to be placed outside of the realm of possibility; for the analyst has been careful to state that his interpretations refer to both real and fantasied events of infancy, to real rejection and fantasied rejection. Thus the analytic postulates place validation beyond the methods of objective science. The adult symptom complexes are real; so are feeding difficulties and divergent patterns of handling the infant's oral needs. The causal connection which the analyst assumes refers as much to infantile fantasies as to these objective events, and these fantasies are inferred on the basis of analytic *interpretations*. Analytic theory rests upon a relationship between an *inferred* infantile fantasy and an *inferred* interpretation of an adult's dream.

To one accustomed to the methods of the laboratory (the control of conditions, the use of matched groups of subjects, the precise documentation of procedures, the rigorous statement of hypotheses, the statistical presentation of results) the generalizations about the oral period seem like "loose talk", brilliant talk, perhaps, but loose. At the risk of seeming unduly meticulous concerning the matter, a critic might raise eight points, as follows:

One. The same character trends are attributed to opposite sources in the oral period. A fixation upon the oral stage and the persistent dominance of oral trends in the personality structure are attributed to oral indulgence and

to oral deprivation. Whereas American clinicians seem lately to have arrived at a consensus, advocating an indulgent program of infant care (feed him when he cries, provide early and recurrent mothering and cuddling, adjust to the child, give him the breast until his own forward-going tendencies are ready to turn to solids and other food sources), Abraham had this to say at an earlier stage of psychoanalytic theory.

"In certain other cases the person's entire character is under oral influence, but this can only be shown after a thorough analysis has been made. According to my experience we are here concerned with persons in whom the sucking was *undisturbed and highly pleasurable* [Italics added] They have brought with them from this happy period a deeply-rooted conviction that everything will always be well with them. They face life with an imperturbable optimism which often does in fact help them to achieve their aims. But we also meet with less favorable types of development. Some people are dominated by the belief that there will always be some kind person—a representative of the mother, of course—to care for them and to give them everything they need. This optimistic belief condemns them to inactivity. We again recognize in them individuals who have been over-indulged in the sucking period. Their whole attitude towards life shows that they expect the mother's breast to flow for them eternally, as it were. They make no kind of effort, and in some cases they even disdain to undertake a bread-winning occupation."*

Yet Abraham—in another connection—describes "the sucker," the one with the persistent oral demands, as coming out of an infantile period of *oral deprivation*. And he is ready to say: "Whether in this early period of life the child has had to *go without pleasure* or has been indulged with an excess of it, *the effect is the same*."†

In this somewhat nebulous stage of theorizing in which opposite methods of handling are thought to produce the same effect and the same methods of handling opposite effects, the psychoanalytic theory does not seem to have reached the stage of formulation where it is susceptible of either proof or disproof. Generosity and avarice, ambition and sloth, volubility and reticence, optimism and pessimism, affection and sadistic cruelty, dependence and autonomy, and a longer list of "opposites" have been suggested as components in the oral character.² To say that an adult shows the qualities of an oral character does not convey a precise meaning. Neither does it have pre-

* Karl Abraham, *Selected Papers*, (Hogarth Press, 1950), p. 400. Used by permission.

† *Ibid.*, p. 397 Italics added.

cise implications as to the character of interpersonal relations operating at the earlier phases of this person's life.

Two. The use of analogy and metaphor in the place of a more rigorous type of analysis is as characteristic of psychoanalytic theory as a whole as it is of their method of dream-interpretation. Because we refer to sarcasm as "biting" are we to consider, seriously, that this metaphor is evidence that the sarcasm originates from impulses first dynamically organized in the early oral period? Are those who chewed and bit their teething rings more prone to become those who later show more biting sarcasm?

Lacking evidence of anything amiss in the oral phase the analyst is free to turn to the later stages. We shall see that avarice, withholding, reticence, aggression, and so on, can also be described as outcomes of the later anal, phallic, and genital stages. Thus infancy serves simply as a convenient screen upon which to project the symptoms of an adult; and by a kind of brilliant double-talk it is possible to draw analogies between the adult patterns and the behavior that develops around the functions of eating and eliminating. Since every one has learned to eat and control his evacuations in some fashion or other, these analogies will always be possible. The scientific question at issue is: Are these the *crucial* factors in the development of the self-system; and are they *sufficient*?

Three. There are two reasons that favor the analytic view of things. The functions whose dominance marks the stages in the psychoanalytic story are vital functions, functions guarded by a heavy emotional loading. When these action systems are disturbed the bodily reverberations are widespread; the autonomic system reacts and sets in motion changes in circulation, respiration, and in the entire digestive tract. The reverberations are "felt" and the tensions produced leave the organism "loaded," sensitive to every cue, impelled to do something about it.

If a critic were inclined to object to the analyst's stress upon these organ systems and to urge that he has mistaken a part for the whole, or that it is the child-mother relationship that is more important than the management of oral zone tensions, an analyst might retort: "True! But what does a person mean to an infant at the oral stage save as that person's meaning is spelled out by oral tensions? A mother may have the most beautiful sentiment about her child and the significance of the mother-role, but if she mishandles the oral tensions of her child the latter will sense her as something she would not like to recognize. Let the child speak (and let the residues of this oral period still persisting in the adult's unconscious tell us who *his* parents were) "

Beginning as he does at the very foundations of growth, the analyst strikes at the roots of all subsequent development. Perhaps he overempha-

sizes the past, overstresses the period of infancy; yet this is the period when the stress-tolerance is lowest, when the adjustment mechanisms that reduce tension are least developed. Why should not the blows of experience leave their deepest imprint at this period?

Four. In this period before the ego is formed, or while its very first layers are being established, there are no words, no highly structured perceptions, no handles with which to grasp the world. There should be nothing in these action-systems that could be laid down as a permanent trace to return in adult years. Nothing, that is, beyond the conditioned responses, notoriously unstable, which later experience would nullify, support, or develop into finer discriminations. Until subsequent experience gives such later support the organism would have no *recollections*, conscious or unconscious, any more than it "recalls" the nasal infection of ten years ago. Scars may be left, as Sontag has demonstrated, in the bone; but in the memory system there is little but the bare groundwork for new responses. Psychoanalytic theory invites us to project into the earliest years experiences that are more appropriate to adult levels of development.

Five. If these highly unstable reaction-patterns of infancy are to become a stable character structure, a continuing subsequent reinforcement is required. The significant persons who steadily influence the course of development must continue to shape the character structure in directions consistent with the vague outlines established in infancy. In this case it is not the primacy of the oral period but the consistency in a continuing interpersonal framework that is determinative.

In the temporal series of events causality is a two-way process. The regressive return to an earlier pattern is caused by the difficulties in the later setting. The susceptibility to the later influences, on the other hand, is caused by the earlier sensitization. In selecting the field of inquiry the analysts show a prejudice in favor of the latter type of search.

This projection of the blame upon a past has a two-fold effect upon the patient. It relieves him of a sense of responsibility for his symptoms. *They* did it; it (the *id*) caused them, the unconscious is to blame. Guilt feelings and anxieties are thus alleviated and the patient can now place himself passively in the hands of the expert prober. Yet in this very passivity there is an unfortunate emphasis upon his helplessness. His therapy depends upon the work of that *other* one. The theory tends to create an infantile attitude and to support the emergence of data that will seem to validate the theory.

Six. The data the analysts offer in explanation of the adult character structure are derived by a procedure based upon an assumption. This assumption asserts that there is a meaning behind all symptoms. Discovering

that *some* symptoms can be understood through the revelation of unconscious meanings derived from the past, the analysts have been prone to generalize, seeking such meanings in *all* symptoms.

A regression to simpler forms of behavior can be caused by any factors that lower psychological tension, by fatigue, by the hardening of the arteries, by a blow on the head, by toxins. To attribute the symptoms that emerge to oral period origins, while overlooking the present causes, is to overload the historical factor.

Seven. Since each of us has had an infancy, whether over-indulged or under-indulged, there are inevitable residues of these influences in our self-system. Symptoms, dreams, recurrent patterns, may testify to their presence. But the relative importance of this early period cannot be assumed, in advance. To further confuse the problem, the hypotheses of the analysts are stated with such a profusion of possible and contradictory outcomes that statistical and experimental validation becomes extremely difficult, if not impossible.

Eight. If the psychoanalyst's weighting of infancy is expanded into a world view its one-sidedness and inadequacy become apparent. Child rearing is not the answer to the world's problems. The responsibilities of adulthood, the need of exercising reasoning and deliberation in the conduct of our affairs, can not be evaded by the simple device of providing an appropriate system of child care. And if we sweep away the problems of adulthood, we might—with equal logic—dismiss adolescence and later infancy, concluding finally that the secret of the good life and of the good society can be solved in the oral period. Actually, education does not stop at any period; and it is precisely the difficulty in handling the sibling rivalries of *adults*, the equitable division of opportunities and goods, the difficulties in achieving stable international organizations, that work back, finally upon this period of childhood, corrupting our ways of handling the child as well as nullifying whatever of good we may, as individual parents, have achieved at that period. Parents, too obsessed with cares and avidities in a highly acquisitive and competitive, status-conscious society, do not handle the oral (or subsequent) periods of their children with the finesse that an optimum development of their children would require. In a sense, the analytic (and somewhat romantic) conception of early infancy represents an attempt at an escape from an adulthood that has proved too difficult. The effort to alter man's fate requires an attack on all fronts; and this holds for the society, as patient, as well as for the person.

As we turn to examine the succeeding periods of development we shall see how the trends in behavior that begin in the oral phase are gathered up

and fused with new trends. If we follow the analytic view consistently we shall have to look upon the later, overlying layers of the self-system—however much they may cover up or conceal the earliest layer—as leaving the trends of the oral phase quite intact. If they are pushed down by the weight of later experiences—some of which may serve to develop counteracting trends—nonetheless these trends continue to exist. The flaw in the foundation will affect the superstructure; and this superstructure will require a special design if the edifice is to withstand adult stresses.

THE ANAL PERIOD

Somewhere between the seventh month and the end of the second year (in our culture) a new problem arises for the newly forming self: bowel and bladder needs have to come to terms with socially imposed restrictions.

There is a certain arbitrariness in selecting a precise period. In a meticulously-run middle-class American home the problem arises much earlier than in a Navajo village. And if a child is maturing at a rapid rate (in physical, intellectual, and social traits) the imposed standards can be met with comparative ease. In any case, at this time the child becomes aware of his own excretions. He learns to apply force in expelling them and he discovers that he can withhold them for a period. By his ability to stand and walk he demonstrates that the sensori-motor pathways joining higher and lower segments of the nervous system are functional; and when he has words to describe his needs (and his excretory products), and when he can understand the words that express adult references to the excretory function, he is ready for socialization in this sphere. He acquires a measure of control over bowel and bladder sphincters, announces his needs, and conforms to the time and place habits his culture imposes. Through conditioning he learns to react to incipient tensions (interoceptive cues originating in bladder and bowel); but it is not until he replaces the reflex evacuation with inhibitory or voluntary sphincter action, and couples his internal needs with the appropriate verbal or gestural announcements, that the process is completed. Like all conditioning and instrumental learning the habit does not emerge fully formed and at maximum strength at once. Performance fluctuates; there is frequent “backsliding.” And the whole emotional tone surrounding the training will be set by the attitudes, procedures, and corresponding emotions of those significant persons who are managing the training. Left to himself, the child would be slow to manage these functions, he has no instinctive anxiety in the matter, nor disgust, to guide him. It is the family more than

he who are concerned, and back of the family stands an evaluating culture, which sets this task and to a large degree determines the timing, the level of expectancy.

When a parent has high standards of cleanliness, and when disgust for excretory functions and products is strong, or where parental attitudes call for accelerated development in all lines, bladder and bowel training may be instituted even before the child can sit erect, unsupported. When the early conditioning studies showed that even the neonate could learn, some parents took this as justification for "training from the start." The fact that walking is neither accelerated nor retarded by exercise of the leg muscles (see page 115) and the fact that the maturing of cerebro-spinal tracts depends upon biological processes that take their own pace—both of these facts were overlooked.

Some studies have indicated that the maturing of the cerebro-spinal tracts involves the growth of a sheath of fatty substance (myelin) which insulates the fibers and prepares them for the patterned conduction that replaces the early mass-reflexes.³

Whether the myelin sheath is the crucial factor or not, the advice to delay elimination training until both posture and social behavior indicate an appropriate level of maturity, is sound and serves to protect the child who happens to be born into a highly accelerating household. Whether or not the myelin sheath hypothesis provides a possible rationalization for such postponement, it is certain that confusion and conflict are created in an immature self-system when the problems are too complex and the pressures too great for his limited level of attainment. This level may, in fact, depend upon a much more general type of preparation—upon the general capacity to delay responses, upon a general level of understanding and coöperation between child and parent.

Ready or not, there comes a time when the child is pressed to conform to the standards of trained adults, a time when the concerns of *others* begin to affect a region in which his own autonomic reflexes have hitherto held complete sway. As for the child, himself, he feels neither disgust nor shame toward these products of his body. He shows curiosity, instead, and may even handle or smear his own excrement much as he would any other foreign body or object of his environment. It is even possible that the contact with his own warm excreta, coupled with the relief associated with the emptying of stretched bowel or bladder, gives pleasure. Psychoanalysts have emphasized this aspect of the eliminative process, even asserting that the child will frequently withhold elimination of the bowels *in order to* heighten this anal pleasure. Thus these eliminative sphincters become "erotogenic

zones." When the analyst describes this behavior as "obeying the pleasure principle" he implies that the libido uses them in its quest for pleasure. But he also adds that these same organs may serve the purposes of the "death-instinct," providing channels through which the first destructive and hateful trends of the child are expressed.

The child's human environment has attitudes toward these products. In our culture the note of disgust is strong, the training rigorous and accelerated. Particularly when the harried mother—with many household duties to perform in addition to the one of cleaning up after her youngster—begins to sense a not-so-subtle negativism and willful resistance. Whether her interpretation is correct or not (and her own anger would make it easy to read hostile intentions into the child's performance) she feels that he soils himself to spite her; and she sees his failure to conform to the imposed schedule as a stubbornness backed by hostility.

If our harried mother were to look into an early essay of Freud she would find an additional cause for concern; for he wrote:

"It is one of the best signs of later eccentricity or nervousness if an infant obstinately refuses to empty its bowel when placed on the chamber, that is, when the nurse wishes, but withholds this function at his own pleasure. Naturally it does not matter to the child if he soils his bed; his only concern is not to lose the pleasure incidental to the act of defecation."*

If we consider toilet training in the light of conditioning theory, and if we remember how one reflex system inhibits another (as when any punishment inhibits salivation) and if, in addition, we reflect upon the arbitrariness with which the adult schedule is frequently imposed upon the infant, it would be surprising if conformity were achieved without stress. Especially where the act of excretion is made the focus of anger, disgust, punishment. Being placed upon the chamber and ordered to excrete, on count, would be too much for most adults; and if the child waits until all the inhibiting stimuli are absent, is it surprising? Only the "sergeant-major" personality which is totally unaware of infantile physiology would feel at ease in interpreting the postponed defecation as a sign of hostility.

Whether the hostility is some original force connected with the anal libido, or the direct outcome of parental "projections" and training techniques, we now begin to understand why the analysts have coupled the word *sadistic* with this emotional complex. Aggression and hostility get coupled with the

* "Character and Anal Erotism," *Collected Papers*, Vol. II, p. 47 (Hogarth Press, 1949). The quotation appears in a footnote and is taken from his earlier essay "Drei Abhandlungen zur Sexualtheorie."

excretory function during this training period; and a simple alimentary function becomes a weapon in an interpersonal battle. It is quite possible that the "negativism" that so frequently develops at this time is a function of the training techniques, an outcome of projected hostility of the trainer. In discussing one of his cases Abraham suggests this rational explanation:

"When she was born her elder sister had been still under a year old. Her mother had not quite succeeded in educating the older child to habits of cleanliness when the newcomer had imposed on her a double amount of washing, both of clothes and body. When the patient was a few months old her mother had become pregnant for the third time, and had determined to hasten the education of her second child in cleanly habits, so that she should not still be too much taken up with her when the third child was born. She had demanded obedience on its part regarding the carrying out of its needs earlier than is usual, and had reinforced the effect of her words by smacking it. These measures had produced a very welcome result for the harassed mother. The child had become a model of cleanliness abnormally early, and had grown surprisingly submissive. When she was grown up, the patient was in a constant conflict between a conscious attitude of submissiveness, resignation and willingness to sacrifice herself on the one hand, and an unconscious desire for vengeance on the other."*

In this instance the mother succeeded all too well, and the anal libido, driven underground, was now controlled by the ego's reaction formations. In the character traits and in the symptoms of the adult this anal libido—still persisting—revealed itself. Such a person, Abraham asserts, will feel sensitive to every invasion of privacy, to every restriction of that area of freedom within which self-determination is the rule. To the concepts of premature training, unwise use of punishment, Freud would add the hypothesis that an unusually large component of anal libido gives unusual weight to these experiences in some individuals. In his first sketch of the development of the anal character Freud noted that their histories showed a resistance to training, a prolonged period of incontinence, frequent lapses in later childhood. "From these indications we infer that the erotogenic significance of the anal zone is intensified in the innate sexual constitution of these persons . . ."⁴

Whether the concentration of motivational forces in the excretory function is primary or not must be left to conjecture at this moment, for the

* Karl Abraham, "The Anal Character," in *Selected Papers* (Hogarth Press, 1950), p. 374. Used by permission.

evidence from individual case histories is scarcely conclusive. There is no denying the fact, however, that many new attitudes toward the self and toward the personal environment develop at this time. The ego is learning what it is to be "disgusting," or "a dirty brat," or "a big boy." He is learning one way in which he can feel nice, clean, good. His eliminative acts now become a method of testing out the environment, of discovering whether it *really* accepts him or not, and through these experiences he discovers the nature of the personalities he is up against. Will is sometimes pitted against will. Out of such contests the child's character-structure is taking shape. A unique parental self is administering the standards of a culture; and a child's autonomic nervous system, with the attendant bladder and colon pressures, is being forced into a social mold. In between the autonomic system and the culture there arises a set of tensions and expectancies; and these sensori-motor attitudes take on a limited degree of regulation of the autonomic functions. A note of ambivalence creeps into the personal relationships. The trainers who have been indulgent rewarders, quick to adjust to the needs of a helpless infant, now begin to make demands, to express dissatisfaction and disgust, and to threaten that whole system of satisfaction-seeking that has operated up to this point without any grave dangers or threats.

How rapidly and smoothly this adjustment process can occur under optimal conditions, and precisely when and how the transitions should be managed, we do not know precisely. With the spread of psychoanalytic knowledge and the general emphasis upon an indulgent program of infant care, judgment has favored waiting until the eighteenth month. The anthropologists have been prompt to notify us that our demands upon our children are much heavier than those of most primitive communities. Primitive mothers nurse their infants longer, do not expect them to acquire control of eliminative functions until much later. In short, the "natural" wisdom of these mothers has more respect for the infant's instinctual demands and for his limited capacities. In any case, since rates of maturing vary so widely, the child's responses to what a parent considers moderate demands are crucial; and some children would be expected to accomplish this developmental task easily at the eight month while others would be slow to respond at the twenty-fifth.

It is difficult to retain a sense of balance and proportion in discussing the role of excretion-control in the development of the personality. Common sense tends to minimize it. After all, most human beings do manage to get over this hurdle, somehow, and they usually have a pretty complete oblivion for the process. Here and there a child will show some difficulty in controlling

the sphincters, and persistent bed-wetting can continue into the adolescent period; but these are the exceptions, rather than the rule. Is toilet training really such a *big* hurdle? English and Pearson think that it is. They observe: "This puts a strain upon his psychological apparatus. At best, learning to meet the environment's expectations and demands of cleanliness is actually one of the big problems of human development. Under the most favorable conditions it can lead to a great deal of anxiety, hostility. . . ."

On the pediatric service of the modern hospital enuresis proves to be one of the frequently recurring problems. Dr. Leo Kanner reports that 26 per cent of the children referred to the service for psychiatric consultation come with enuresis as a major difficulty.⁶ In evaluating the problem, however, Dr. Kanner is inclined to see it in terms of a broad setting: 39 per cent of the children were seen between ages of 9 and 11 years; and they impressed the physician as a *generally* immature lot, moody, complaining, irritable, whining. Instead of viewing the toilet training as the central feature he was more impressed by the total complex of factors which had produced this type of *person*. In many cases he found the "maternal overprotection" pattern in which the child had not been taught to dress himself, to tie his shoes, to cross the street. Just as the mother had thought that her child was too weak, too small, to do these things, she had felt that her child was unable to learn sphincter control. He found that irregularity in this type of training was often accompanied by irregularity in meals, bedtime, and general attention to cleanliness. Often the family were not greatly troubled by the problem, having brought the child to the clinic for entirely different causes. He also found that the families had used poor training techniques. Bribing, shaming, beating, disgracing, pressing the child's face into the soaked bedding, were some of the devices.

In Dr. Kanner's matter-of-fact account the striking fact is that the sphincter problem is not so great in itself, but rather that this training problem serves to bring out the weaknesses in the personality structure of the parent, to put a stress upon tenuous child-parent relationships, and to build around the problem of control of elimination new and additional complications in character structure.

It would be easy to imagine various combinations of factors that could produce stress at this point. Take, for example, a certain type of career-mother, who is already irked by that interruption of her own personal growth (as she has phrased it) by marriage and childbearing. Why should she be the one to bear the brunt of this unpleasant business—the diapers, the feedings, the virtual confinement to barracks. Resentful of her maternal

role, she frets under the claims the infant has upon her. The task of training her child requires a tolerance and a serenity that she may be unable to muster.

- Such a mother will, in all probability, try to hurry the process. She will experience resentment and hostility in response to what she interprets as the child's stubbornness and slowness in taking over new patterns. In short, all of the latent hostilities underlying the mother-child relationship will be pushed into the open. This hostile component in her ambivalent attitude can now find a target; and it seems to her to be amply justified. As for the child, insecurity is increased still more by this new evidence of the tenuous nature of the affectional foundation of his life. The child's attitude is not a simple function of myelinization, learning rates, nor of the strength of investment of libido in urethral or anal zones. It arises from a total interpersonal setting which existed prior to this episode and which will continue throughout his childhood, indeed, it even betrays the influence of that broader culture, which assigns very special roles to women. But most of all it reflects the way in which a particular mother has come to terms with her own role in life.

We can see, too, how such a situation can produce effects that spread to the later sexual phase, as it appears. Not only is the trainer the same person but also the zones are proximate and the language of shaming, of disgusts, is the same. "Nasty," "dirty," "vulgar," "disgusting," and conversely, "modest," "clean," "good," "pure," are made to cover both cases. And it is also the same self-system that is being built, bit by bit, as these changing problems are mastered. And at this early period, when the child has suddenly become a runabout with countless potentialities for mischief, or danger, the problem of restriction and guidance can be difficult, particularly in a crowded apartment or on a street where traffic is dangerous. Thus while the child is being asked to give up his autonomy over eliminative reflexes, to conform, to be good, to discriminate both time and place, he is learning dozens of other boundaries. His growing powers demand new areas of freedom; but they also call for new restrictions. The tensions developed in one sphere spread to others, and each of the tensional situations centers upon the same interpersonal relationships. It is difficult, theoretically, to decide whether the visceral-autonomic problem is the leading and causal segment spreading to other adjustments, or whether the reverse relationships are the important ones. All that psychological theory has taught us in the way of caution in singling out the part as *the* cause of the whole should warn us against making the organ into an explanation of the child, or in seeing the anal-erotic character as emerging from a single training technique or episode.

The "Anal-Erotic Character"

The problem of whether to look upon the whole character as the outgrowth of the instinctual forces that arise within these organ-systems, or to look upon the part-systems as showing properties that reflect conditions in the system as a whole, returns when we look at the analytic conception of the so-called anal character type. When this adult type first caught Freud's attention, he was puzzled by a frequently recurring triumvirate of traits. Why should the traits of obstinacy, parsimony, and orderliness, go along with constipation? And why should these patients show, in their history, an unusually long and difficult period of training of the anal and urethral sphincters? (The analyst has asked these questions but has never supplied the validating data.)

As with the oral period we find traits that represent *continuations* of the infantile trend, reaction formations *against* the anal-erotic impulses, and *sublimations* (acceptable expressions which partially satisfy the impulse and the repressive standards). Thus the infant who shows no disgust, and, indeed, seems to take a positive pleasure in handling feces, smearing clothing and bedding as though a kind of instinctual delight were involved, may later turn to making mudpies (or to smearing the bathroom wall with shoe-blackening). Or he can sublimate his needs in socially approved fashion with plasticine, sand and water, or with the finger-painting of the nursery school. If he "plays doctor," endlessly filling bottles and pouring them into one another, an analyst would be ready to see more than mere imitation of grown ups. He might be ready to see him as struggling with (and giving symbolic expression to) eliminative impulses and pleasures. And if he becomes, still later, an artist, it is possible that his "smearing" on canvas is the final sublimation of impulses of a very humble origin (an origin that is concealed and that would be vehemently denied, as blasphemy, particularly by an artist whose *Art* is spelled with a capital).

If, in his struggle with these eliminative functions, he has to oppose strong counter-forces (since they threaten his whole economy) in order to keep the love and esteem and all the privileges granted by his parents, the withholding is apt to spread to other forms of withholding. English and Pearson write:

"The whole later-life attitude of generosity gets its start here. Many people have had such a difficult time in the first two or three years of life that they always have difficulty in bringing out their generous impulses. They always

have an anxiety about being imposed upon, always fear repetition of the exploitations that occurred in their childhood.”*

It is as though the child, who is asked to “make a contribution” at the request of the trainer, to give up something that is “valuable” (a source of anal pleasure) now reacts, as an adult, in the same way to the visitor who comes for a contribution to the Community Chest. He feels, “I like to make a gift to someone in my own good time, in my own way. I’m not prepared to subscribe now.” For Freud the analogy has deep-lying dynamic meanings (The skeptic will scent paralogical reasoning.)

Obstinacy, self-will, and extreme orderliness are understood in the same manner: the first two represent efforts to maintain inviolability and the sense of power that was threatened by the trainer. The neat, clean, and excessively orderly person represents the case in which a virtue has been made out of necessity. In escaping the category of the “nasty, dirty, little brat” the individual has become ultra-good, ultra-clean, ultra-orderly. Here the analyst also sees a reason for the hidden hostility sometimes found in the obsessively “good” and orderly person. Taking his cue from his study of the obsessive neurosis in which the patient worries constantly lest he hurt others (frequently those near and dear to him), imagining that by his neglect he will cause their death, by the careless use (or intentionally violent use) of knives or scissors he will harm or maim his loved ones, the analyst sees a suppressed (and hateful) component as a residue that arose from a primary anal frustration. These worries are, after all, of this patient’s invention. The fantasied crimes are of his own ordering. It is as though the conflict centering around the eliminative function had stirred up the “death-instinct.” In the truly depressed person this anal destrudo is turned against the very self. So the theory goes.

The tendency to withhold, to retain, to collect, is interpreted as evidence of the persistence of the infantile sense of value, which originally was invested in its excretory products. The child who is a collector of marbles, buttons, becomes a collector of coins, a hoarder of money, books, and art treasures. What the skeptic might be willing to admit as an occasional sequence, the analyst turns into a generalization. “All collectors are anal-erotics.”⁷ And not only collectors of objects. The collector of facts, the editor of compends, the dictionary maker, the pedant, the classifier.

An interesting fusion of opposites in the character of the obstinate anal-erotic type is revealed in his combination of a reaction against an imposed

* O. S. English and G. H. J. Pearson, *Emotional Problems of Living* (W. W. Norton & Company, Inc., 1945), p. 56. Used by permission.

authority and his readiness in imposing his own authority. Unable to conform easily, he struggles against every outside convention, every ordering of his life by others. Abraham is ready to say: "In social life they constitute the main body of malcontents, . . . inclined to be exaggerated in their criticism of others, and this easily degenerates into mere carping."⁵ And yet these very ones are also the rule-makers, the executives who have to issue a daily bulletin to their staffs, who have to prescribe in meticulous detail each bit of routine, the "dictators" who can brook no deviation from their wishes, "power-seekers" who find their security in a role that enables them to force their will upon others rather than in the kind of relation that depends upon their success in winning affection and establishing reciprocal trust.

The group of traits emphasized in the psychoanalytic discussions of anal character-structure contains the same galaxy of "opposites" that we found in discussing the oral ego, and it is sometimes difficult to determine which of the two extremes in training techniques is responsible for the adult character traits. Thus Abraham can speak of "the avoidance of effort (as) a frequent feature of the anal character" and within three paragraphs find that "perseverance and thoroughness" are often exaggerated. He speaks of those who "avoid taking any kind of initiative," behaving in analysis like the child who waits for his mother to give him a suppository; but he also stresses the stubbornness, the "I-want-to-do-it-myself" trait in these people. The tendency to extravagance exists beside miserliness, hoarding, and the meticulous and orderly traits are matched by "smearing tendencies" and by disordered drawers and cupboards (concealed by a superficial order). The morose expression of the person who seems to be continually smelling a bad odor is commented upon, but there are corresponding comments upon those whose "too sweet" expression and outward "niceness" conceal anal-sadistic hostilities. It thus appears that in the psychoanalytic formulation, as in the horoscope of the astrologer, we have such a neat balancing of opposed traits that it is possible to find anal-erotic bases for whatever trait may be chosen.

Some of the followers of Freud have attempted to modify his theories in the direction of common sense and logic. Thus Horney raises the question as to whether it is not the whole person that regulates the organ system, rather than the reverse. "A person does not have tight lips because of the tenseness of his sphincter, but both are tight because his character trends toward one goal."⁶ Giving versus retaining, obeying versus rebelling, saving versus spending, regulating versus freeing, exploitation versus con-

* Karen Horney, *New Ways in Psychoanalysis* (W. W. Norton & Company, Inc., 1939), p. 62. Used by permission.

structive giving—these are general conflicts that arise in the whole area of interpersonal relationships. Maternal control affects a child's freedom to play as well as his freedom to evacuate his bowels.

The infant who is made to feel helpless (through his own lack of coping mechanisms or because of an outer press that is too much for him) will develop defensive measures no matter whether his needs are oral, anal, or merely the ones arising from his play activities. Defiance, dependence, willing obedience—whatever the trend that finally resolves his insecurity-tensions—will take form from a total matrix of pressures rather than from some constitutionally determined libidinal investment, or from a specific training technique that affects one organ system.

Horney's argument goes further. "When in dreams," she writes, "an individual of this type symbolizes persons through faeces, the libido-theory explanation would be that he despises people because they represent faeces to him, while I should say that representing people in symbols of faeces is an expression of an existing contempt for people."^{*} The orthodox psychoanalyst is perhaps right in resenting the intrusion of such "revisions" into the theory of Freud; for the questions Horney raises challenge the whole logic of the psychoanalytic system. Horney's criticisms also reveal that her own system has its own degree of arbitrariness, since she—as is the case with Freud—can cite no experimental studies in her behalf. One set of clinical experiences challenges another.

Murray's revision points in a similar direction. He looks upon the two trends (the out-giving, expelling, anal-sadistic and the withholding, retaining phases) in the anal-erotic character as "general vectors" which express themselves prior to anal training and are capable of independent development.⁹ He observes that in their pathological extremes they are always associated with "anal fixation." In this version of the theory the extroverted, outgoing, expressive child will have difficulty in meeting the part of anal training that demands a withholding, a conformity to schedule, while the inhibited, shut-in, and seclusive child will find difficulty in meeting the demand to produce something on schedule, and in a semi-public way. This suggests a conception of constitutional predispositions toward extroversion or introversion similar to that posited by Jung.¹⁰

In any psychoanalytic account the full effects of anal training are not conceived of as appearing before the final (genital) stages of libidinal development are reached. The capacity to love and to be loved, to arrive at mature heterosexual adjustments, to give out, create, construct, to cooperate with

^{*} *Op cit.*, p. 63. Used by permission.

others while at the same time fighting fairly for one's own share of the products of joint labors, is a final stage in the development of the personality which the neurotics, the arrested ones, do not attain. Whether the fixations at the oral and anal stages show themselves, at maturity, in full-blown symptoms or in twists and exaggerated emphases, whether these earlier developmental interests find their way into sublimations or into repressive counter-formations, it is their role in the establishment of "genitality" that is the characteristic Freudian emphasis. As Freud once wrote "There is no neurosis where there is a normal sex life," so one might paraphrase his evaluation of the pregenital phases: "There is no mature and wholesome self-system, nor normal character structure, where fixations at the oral and anal stages have deprived the productive self of its energies or directed them into excessive and exaggerated expressions more appropriate to childhood."

The *phallic* period, which follows, is the most crucial phase of all. It was upon this earliest emergence of genital interests that Freud originally fixed his attention when he began to explore the preadolescent roots of sexual life. And it was here that he believed the explanation of the hysterical character could be found.

REFERENCES

- 1 Freud, "Thoughts for the Times on War and Death" (1915), *Collected Papers*, Vol. IV, pp. 288-317 (Hogarth Press, 1949).
- 2 See, for example, H. A. Murray, et al., *Explorations in Personality* (Oxford University Press, 1938), pp. 370-379.
- 3 O. R. Langworthy, "A Correlation Study of the Development of Reflex Activity in Fetal and Young Kittens and the Myelination of Tracts in the Nervous System," *Carnegie Institute Contributions to Embryology*, 20 (1929), No. 114, p. 127.
- , "The Behavior of Pouch-Young Opossums Correlated with the Myelination of Tracts in the Nervous System" *Journal of Comparative Neurology*, 46 (1928), pp. 201-248.
- 4 Freud, "Character and Anal Eroticism," *Collected Papers*, Vol. II, p. 46.
- 5 O. S. English and G. H. J. Pearson, *Emotional Problems of Living* (W. W. Norton & Company, Inc., 1945), p. 45.
- 6 Leo Kanner, *Child Psychiatry* (Charles C. Thomas, Publisher, 1935), p. 37.
- 7 Ernest Jones, *Papers on Psychoanalysis*, 4th ed. (William Wood & Company, 1938), p. 545.
- 8 Karl Abraham, "Contributions to the Theory of the Anal Character," in *Selected Papers*, (Hogarth Press, 1950), p. 378.
- 9 Murray, *op. cit.* p. 380.
- 10 C. J. Jung, *Psychological Types* (Harcourt, Brace & Co., Inc., 1923).

CHAPTER 21

The Phallic Period: The Oedipus Complex and Birth of the Super-Ego

At this third stage of personality development we arrive at a group of concepts which actually antedate those we have been considering and which formed the foundation of psychoanalytic theory. Here we meet the family romance, the Oedipus conflict, with its frank exposure of infantile sexuality; and at this phase the term *sexuality* begins to take on a meaning closer to ordinary usage. More than any one of Freud's theories, his conception of this phase of sexual development has caused violent reactions. Not only did Freud remain unmoved by these reactions to the logical extension of his theory; he took their very violence to be proof of the truth of his conjectures.

Autoerotism, Incestual Wishes, and the Castration Threat

In this period (from three to five years of age) the child discovers his own body and the possibility of producing sexual pleasure by the manipulation of his own genitals. And his maturing sexual impulses now direct themselves upon his parents, particularly upon the parent of the opposite sex. Already, however, his sexuality has been shaped by the oral and anal phases, and the way in which he has come to terms with those who have been the gratifiers, trainers, and thwarters of his impulses now enters into his manner of adjust-

ing to these new demands. Again his impulses are greeted by restrictions. He is not granted freedom to indulge his autoerotic impulses, and his sexual claims upon the parent meet the incest taboo. Disappointed and frustrated as he must inevitably be, and equipped only with the immature ego of a child, he has to grapple with these problems and come to terms with powerful forces within him.

As a matter of fact, it is in the resolution of these impulses that Freud located that basic splitting of the mind into conscious and unconscious levels, the establishment of a conscience with a feeling of guilt about one's transgressions. Here, too, begin some of those attitudes that typify, at maturity, the masculine and feminine psyche. Not only does the child now note the differences in the bodies of men and women, he begins to sense a difference in roles and to anticipate his own destiny. So much that occurs at this time is poorly verbalized, and so much of it is full of threats to the individual's security (threats whose nature and whose rationale a child cannot fully appreciate) that it cannot be consciously assimilated. The conscious self-system that emerges from this conflict has a spurious integrity, a deceptive calm, for its integrity and freedom from confusion are purchased at a price: the welter and confusion, the conflict and frustration of the phallic period have been repressed. The adult will not recall, later, the pre-Oedipal impulses, but they will still exist underneath his attitudes toward himself and toward the world.

In fact, the laying away of these childish impulses preserves them from the attrition that normally affects conscious experiences. Like the animal who has undergone avoidance-training and who "never goes near the place" again, the conscious ego cannot review and re-evaluate what it is not aware of. Freud compared these repressed ideas to the relics discovered under the ashes of Pompeii, preserved as they were from the effects of erosion. But though we have lost them to conscious recall, the dynamic structure of the self-system bears the mark of their existence. In fact, its present form betrays the nature of the forces that were repressed. Moreover, these same impulses continue to exist in the unconscious, ready to seize upon our action systems when the ego and its defenses are, for any reason, weakened, and against their continual pressure the ego must set up counteractive trends, continually deploying forces and expending energy to keep them in their place. Now that I am a man—we say, in effect—I have put away childish things. The neurotic, however, has not done a very good job of putting them away; and the rest of us (if, indeed, we fall outside this category) can only be amazed at the nature of that which has been put away—amazed, at any rate, at the implications of Freud's line of reasoning.

Not only is the adult's approach to the later sexual problems of maturity fixed by the repression at this period; the entire character structure gets its final shaping. His creativity, his attitude toward his work, his attitudes toward superiors and rivals, his ability to withstand frustration and deprivation, his "need to be first" and his need to seek status, power, wealth, his capacity to love, his sense of fairness, his ability to express aggressions—all take their final form at this time. And if the individual achieves what the psychoanalyst calls "full genitality" then it is because the preceding oral and anal phases have been so well resolved that the ongoing forces of the growing self finally surmount these hurdles of the phallic period. To be sure, there will be the final coming to terms with sexuality at adolescence, but the solutions achieved then depend upon the earlier solutions of infancy. Thus it is that the analyst is ready to assert that the main lines of the character structure are established at the fifth or sixth year; for by this time the third, or phallic, phase has been surmounted.

Not all analysts have agreed with Freud's interpretations of the phallic period. To name but one of the sources of conflict. Freud saw in the child's discovery that girls do not possess a penis the root cause of divergence in the psychology of the sexes. From this point on, Freud asserted, the boy is haunted by a castration threat which now takes on real force, since he has seen the actual consequences of those threats his parents used when they wished to frighten him into stopping masturbation. It had happened to the girl! The girl, on her part, is supposed to realize the difference and to react to it as the sign and seal of her inferiority. Indeed, she is pictured as spending much of her later effort at recapturing what in her infantile fantasy she imagined had been lost, finding in her husband and in her son the objects that make up for her primal loss. She discounts the roles all women play, belittles her own sex, and shows compensatory striving. Some analysts have argued that this primary wound to the little girl's vanity weakens her ego, even weakening that portion of the ego that acts as censor. These theorists conclude that this primal loss, therefore, underlies a certain weakness in the feminine character. This particular phase of psychoanalytic theory coincides with the views that have long been congenial to the Central European male.

Horney's Criticism of Freud's Interpretation of the Oedipus Complex

Freud's theory contains, among others, two basic assumptions: (1) *all* of the adult's interpersonal relationships are rooted in infantile sexuality, and (2) the infant's sexual life unfolds according to a fated biological rhythm and pattern, instinctively directing its claims at the phallic period toward the

parent of the opposite sex. Horney has attacked both of these assumptions, offering a more matter-of-fact explanation for the events Freud was trying to explain.

Where relations with the parent appear to be sexualized Horney suggests that we might look to the actual conditions obtaining in childhood:

1. In the handling of the child, in bathing and caressing, there may be actual stimulation of erogenous zones and a premature awakening of sexual feelings. Cross-sex preferences may also be viewed as the reflection of adult choices, for the parent sees in the child of the opposite sex a small copy of his own love-object.
2. A parent who lacks the normal relationships with a mate (through actual death or separation, or through unfaithfulness, or through other pre-occupations of the partner) may turn to the child for emotional responses and expressions of affection that would normally be sought from the sexual partner. Even where these are not overtly sexual, in any way, they may involve a narrowing and centering of the child's affectional life upon the parent so that a later freeing of the attachment may prove difficult.
3. The parents are the protectors and trainers of the child. Through their techniques they may delay the maturing of the child or introduce threats of one sort or another. In either case a dependence upon and a clinging to these sources of security easily masquerade as a need for affection. If, later, the child transfers an attitude of clinging dependence to the mate (as when an overprotected girl clings to a dominant husband) we need not see in this a confusion (in the unconscious) between mother and mate; nor need we re-project into childhood a sexualizing of mother-daughter relationships simply because in adulthood, sexuality plays a role between the wife and her husband.¹

In this view of the matter the relations between child and parents are not the simple outgrowth of a biological impulse that instinctively picks out a love-object of the opposite sex and makes the full sexual demand upon this object. We observe, instead, that the child's character is formed out of a totality of instinctual forces coming to terms with a web of interpersonal forces. And we see the similarities between the adjustment mechanisms of the child and those of the adult as due to the continuing forces which affect the organization of the character, rather than seeing the constancy of the character as dependent upon a continuing biological force within the individual's makeup.

Freud's Evaluation of the "Psychology of Women" in the Light of His Theory

Freud's lecture on "The Psychology of Women" contains several contradictions.² He is ready to admit that cultural forces have a great deal to do with setting up those differences in character that we find between the sexes, but he believes that the main differences are established by the vicissitudes of the libido in the Oedipal and pre-Oedipal periods. He is ready to describe the male as essentially active and aggressive, the female as essentially passive, and to attribute these differences to instinctual, inherent, constitutional differences. But he repeatedly cautions us against this very differentiation, insisting that "there is only one libido." And while most of the characteristics he stresses as peculiarly feminine (lack of social sensitivity, weak super-ego, defective sense of justice, envy, cattiness toward other women, and so on) are not among those traits we call desirable in our culture, he admits that "an individual woman may be a human being" for all that, and he speaks of her role and function as "inestimable."³

In a sense the voyage of the feminine libido is a more difficult one than that of the male, for the first love object, the mother, is of the "wrong" sex. Mother will do as "the nourisher" and "the trainer" but she is not possible, finally, as an object of the sex instinct of the female child. If she were to remain fixated upon this type of love object a homosexual attachment would be her certain fate. The boy, on the other hand, can work out oral, anal, and genital problems on one type of sex object. Thwarted at the Oedipal period from the achievement of his childish aims he has but to find, later, a substitute love object of the same sex. The girl, gratified by and attached to the mother at the oral period, must shift her attachment to a person of the *opposite* sex. This, alone, would account for a greater confusion in aims in life. But the primal wound to the feminine psyche, Freud is sure, comes with the realization of her lack of a penis and with the further fantasy that it is the mother who is responsible for the loss. Thus the nourisher and the loved one is also the dangerous one.

In their dreams (as interpreted) and in their actual complaints, Freud heard his female patients expressing a hostility toward their mothers. She had not gratified their hunger sufficiently when they were nurslings, she had not nursed them long enough, she had prohibited them from those explorations of the genitals when, as a child, the first clitoral sensations were produced. Freud had learned to discount these complaints of his subjects. In the early stages of the development of his theory he had accepted the references to parental seductions, accounts of ogre-like disciplinarians, and believed that

he was dealing with real traumas in his patients' childhood. With more experience, and with repeated failures in attempts to validate the stories, he became convinced that these stories were founded on fantasies. And they seemed to serve as rationalizations or justifications of current emotional attitudes rather than as true causes (that is, as objective and verifiable events which "conditioned" the child in specific ways) So, now, in hearing out his female patients, he came to conclude that the treatment they complained of was not the central fact underlying their attitude. This central fact they had repressed; it had been more threatening than they could bear. A fantasy of castration had been founded upon the simple and obvious fact that their bodies were formed on a different anatomical plan from the male child's. The fantasy was required, moreover, for dynamic reasons; sexually they wished to be different, more masculine. Who had done it? Who, indeed, but the mother, the powerful one, the loved one, the nourisher, the trainer. The one whose punishments and threats had been directed against the childish exploration of the genitals. The one whose love seemed to flow out more freely to the brother (who had a penis). When, in infancy, the girl child happens to reach this phallic phase at just the time when a baby brother is born, and when in fact the mother is giving her full attention (and nursing) to this brother, this narcissistic wound is intensified. What does he have that I haven't got?

Freud saw three possible outcomes arising from this primal psychic scar: a compensatory "penis-envy" which take the form of a "masculinity complex", an inhibition of sexuality and possible frigidity, and an identification with the mother, a turn to normal femininity. The trend of masculine striving comes very close to the Adlerian conception of compensatory response to a sensed deficit. To be male now means to be whole, to be complete, to be valued, to be loved, to have power. Tomboy as a child, she challenges her male playmates and strives to outdo them. Through high school she remains scornful of feminine roles, of soft and sweet femininity, and continues her aggressive competition with males, still needing "to be first." At the threshold of maturity she is torn between marriage and a career, between the role society has provided for her and the role that will compensate for this primal scar. She may choose as sexual partner a person of the same sex, or—following what is expected of her—marry a man only to discover that he must function as her child, her son, her dependent (if he is to fulfill all her needs) and to discover that the sexual part of marriage leaves her utterly cold. Indeed she is pained, insulted, frightened, angered, by her sexual role.

Thus (in the Freudian view) the prudishness, the Puritanical strain in feminine character, and the dash of frigidity that is all too frequent, come

from the single source. What is modesty but an effort to conceal a blemish?*

The Emergence of the Super-Ego

The full effect of this primal scar cannot be understood until we understand more fully the process of super-ego formation. Freud, himself, is content to leave much of this a mystery; but the essence of the process lies, he feels, in the forced renunciation of the parent as a love object. The dawning sexuality of the infant knows no conventions, curbs, taboos, limits. The id demands a child by the parent, the libido craves genital contact. This is the startling meaning revealed by Freud's interpretation of the adult's dreams. Nevertheless these aims had to be renounced; and so great were the threats stirred by these emerging impulses that they had to be repressed, tucked away in the unconscious. And the parent image is incorporated, internalized, in the process. The libido clings to this image as a sweetheart clings to the image of her martyred hero, and the fantasied parent-lover is forever enshrined within the unconscious, where, protected from the attrition of experience of more mature years, it persists unchanged throughout life. This parent-image is the *fantasied* parent, not the *real* parent, it is the king or queen that the infant imagines the all-powerful one to be. Suddenly the trainer, the nourisher, and the voice of conscience have been fused into one. A censoring function is now carried about within the child. When he acts his deeds are evaluated by this censoring one. Even as he moves an inner voice carries on a running commentary, and if he is to be worthy of love he must have regard for this voice within. He must choose aims that are worthy, he must mature toward this ego-ideal. As strong as the claims of instinct—and, indeed, deriving its very force from this source—the super-ego now curbs wayward impulses. What had been, hitherto, a conflict between the id and the trainer now becomes a conflict within the individual between the id and super-ego. And the quality of the relationships that have obtained throughout the oral, anal, and early phallic period now becomes a dynamic quality of the systems within the very self. If mother has “yammered” the super-ego now “yammers.” If the training has been weak or inconsistent the voice of conscience is uncertain. If the trainers have been gentle, accepting, but insistent, conscience, too, is gentle but firm.

Now it would simplify matters for our theory if the course of super-ego formation were the same for the boy and the girl. Thus if we could posit a

* Freud shows his own capacity to indulge in fantasy, at this point. Granting to womanhood the single invention of plaiting and weaving, he derives this art from the fact that at puberty Nature herself designed a thatch to hide the genitals, and from the fact that envious woman was the one motivated to develop Nature's device into the skilled act of weaving.

feminine libido which instinctively fastens upon the father as the first love-object, a male libido which instinctively fastens upon the mother as its first-object, then—with the inevitable inhibition of the instinct at the phallic period when its full force is first felt—the feminine psyche could take on the father-image as its conscience and ego-ideal, the boy's super-ego taking a maternally determined form. Or we could even attribute these first sex choices to parental preferences, since the parents might be expected to choose—for special expressions of affection—these small copies of their own love objects. But Freud feels that neither of these ways out is correct. On the one hand, he believes that all the evidence points to a similarity in the male and female libidos. And his experience led him to assume that the mother is the first love-object of *both* sexes.

The Super-Ego and the Feminine Character Structure

How do these assumptions affect the account of the female character? And why should the shift in object-choice of the girl be associated with the postulated later weaknesses in the feminine character? And how is the voyage of the feminine libido affected by the primal scar?

Since the mother is the first love-object the libido of the girl child desires “to get the mother with child” and “to have a child by the mother.” The mother is both “seduced” and “seducer.” In the acts of nursing and bathing the first stirrings of instinct are initiated by the mother.* But this first love-object acquires peculiarly potent attributes for the girl when, in the phallic period, she discovers her great inferiority. And, adds Freud, “the girl holds her mother responsible for her lack of a penis, and never forgives her for that deficiency.” When, therefore, the girl turns away from her first love-object, it is in an atmosphere of hostility and disappointment. Now the complaints and grievances multiply: she did not feed me enough, she did not nurse me long enough, she turned from me to my brother, she was severe in masturbation-training, and so on. But these complaints, Freud came to believe, merely mask the true foundation for her sense of deprivation. And if she becomes envious, if she needs—more deeply than the boy—expressions of love and affection, if she develops a “masculinity complex,” and if she lacks a sense of justice and an interest in broader social problems, and if she remains on poor terms with a super-ego whose force remains weak, it all dates from this primal fact. There is, therefore, an alienation from conscience and an alienation from the feminine ego-ideal which does not find

* When, in paranoia, regression carries the patient back to these pre-Oedipal fantasies, the analyst sees the connection between foods and poisons—in the patient who fears to eat lest he be poisoned—as an expression of the mixture of love and hate which gratifications and frustrations of infancy produced.

its counterpart in the male. All the factors surrounding the formation of the male super-ego, Freud avers, are similar—save for this one—and they do not “alienate him from his mother-object”

When the girl-child subsequently turns to her father to demand a child from him (in fantasy, at least) it is with a background of this first failure and rejection, and with the realization of the primal scar. There is, moreover—so Freud thought—a second hurdle that offers special difficulties for the female child. The discovery of the genitals, in the male child, is easy. It is less so in the female. In fact the vagina remains shrouded, hidden, and does not figure in the infantile fantasies; and her clitoral masturbation has been forbidden by the castrating mother. When she turns to the father it is away from the dangerous mother and to a haven of refuge; but with a much less clear notion of her libidinal needs. Thus Freud thought he had found a reason for the slower and often long-delayed resolution of the Oedipus complex in girls. And for this reason, Freud wrote, “the formation of the super-ego must suffer . . . ; it cannot attain the strength and independence which gives it its cultural importance and feminists are not pleased if one points to the way in which this factor affects the development of the average feminine character.”*

To develop such a complex theory of the sex-typing of character structure when the facts are insufficiently clear seems somewhat premature. To make matters worse, many clinical facts do not fit in with these views. Consider the simple fact of toilet training. Here is an instance in which the control function (that internalized parent image) seems to appear earlier and to operate with greater efficiency in the girl child. Of the children referred to the psychiatrist in Kanner's clinic, 62 per cent of the enuretics were boys, 38 per cent were girls. And this weighting corresponds to folk experience: boys are more difficult to train.

And there are many questions that Freud blithely passes over. Why should the girl imagine that the mother is the castrator when the latter has also suffered the same fate, and when—in the pre-Oedipal centering upon the mother-object—the father must be the hateful rival?[†] And if it is the castration *threat* that causes the child to repress the Oedipus relationship (as with the boy) why does not the fantasied *fact* operate with even greater force and thus produce a *stronger* conscience in the girl?

Scattered through Freud's essay are many dicta giving evidence of his own feeling of masculine superiority. We might almost imagine that he is writing

* “The Psychology of Women,” in *New Introductory Lectures on Psychoanalysis* (W. W. Norton & Company, Inc., 1933), p. 177. Used by permission.

[†] Abraham cites the case of a patient whose dream clearly (?) implies that it is the father who is the castrator.⁴

of a Chinese culture in which the male child has high value, and the female child a very low one. He speaks of the woman who is unfulfilled until she has had a male child (explaining that it is the one way in which her penis-envy can be gratified), and he adds that it is through the son that the deepest desires of the woman have to be gratified "The only thing that brings a mother undiluted satisfaction is her relation to a son, it is quite the most complete relationship between human beings, and the one that is most free from ambivalence" ⁵ (One wonders whether Freud is not, here, an unconscious autobiographer, in addition to being a mouthpiece for a male-centered culture)

For all the slow maturing of the girl Freud believes that the mental growth of women is soon over. The woman of thirty has settled into the rigidity of old fogginess while the man of thirty is still very much unformed and on-the-make.

He finds evidence, he feels, to explain why many marriages run aground. The hatred for the castrating mother is carried over to the husband, and the marriage that began as a perfect resolution of infantile conflicts ends in a battle that reflects the earlier struggle of the child against her mother. And the wife's first child may revive an earlier identification with her mother against which she had struggled up to the time of her marriage, and if the child is a daughter this outcome is made more probable.

The libido, which he refuses to separate into male and female types, is more easily fitted into a male career. Nature simply made a bad job of implanting such a force in an organism that is anatomically female "More violence is done to the libido when it is forced into the service of the female function" ⁶ And the voyage of the female libido is more prone to the regressions of homosexuality since the primary love object is of the same sex.

In speaking of his own lecture on femininity, Freud comments. "It contains nothing but observed facts, with hardly any speculative additions" ⁷ Let the reader note the traits Freud regards as characteristically feminine, and draw his own conclusions

Freud's list of feminine traits:

Passive rather than active. compensatory aggressiveness and masculine striving, when present, indicate both a constitutional element and an inability to achieve mature femininity through adequate resolution of the Oedipus situation.

A greater amount of internal conflict: frequent swings of mood and reversals of direction

A narcissistic and vain creature.

Passive aims: to receive, to incorporate, to be loved, etc

Less prone to express aggressiveness outwardly and more prone to experience these impulses when turned against the self.

Masochistic: experiencing pleasure in being punished.

Compliant, submissive, dependent.

Affection-seeking.

Envious, jealous, with a tendency to feel aggrieved, hard done by.

A weak sense of justice.

A weak social interest.

A stronger homosexual component.

A weak heterosexual component.

Modest, prudish, frigid.

Full of feelings of inferiority

A weaker super-ego and a weaker capacity to sublimate instincts.

Rapid early development followed by an early rigidity.

Horney's Criticism of Freud's Concept of Femininity

Against the conclusions and interpretations of Freud it is interesting to place the observations of Karen Horney, who is also qualified by training and analytic experience to speak on this question. Basically, her argument runs, two weightings in Freud's analysis need correction: (1) an ultra-biological view needs the correction that comes with a proper consideration of the cultural factors, and (2) the products that are the outcome of the entire developmental setting should not be attributed solely to sexuality.

It is easy to see that there are many factors in the position of women in our society, and in the methods of training the girl child, which produce differences in status, power, and ease of satisfaction of instinctual demands. The envy which Freud describes, and which—in many neurotic women—takes the form of an envy of the position of the male, can be due to dozens of factors in the development of the girl. A preferred brother, a limitation in freedom of play and companionship not felt by male children, personal inadequacies and shortcomings that are complex and difficult to accept, may give rise to feelings of inadequacy and inferiority which favor the easy explanation. (If only I were a boy!) This is a mechanism of displacement and rationalization, however, that can be used by either sex. A boy may displace his feelings upon some physical defect, too. Perhaps it is the position of women in our society that makes it particularly easy for the neurotic and immature woman to think that a male role is the real solution for all her difficulties.

We can see, too, that an over-valuation of love and affection, and a center-

ing upon a romantic dream which is to bring solution to all of life's difficulties, can be a masculine as well as a feminine trait. But we can also see that the conventional role assigned to women must make them particularly prone to this kind of "solution." Similarly, the emphasis upon being personally attractive, upon all the little narcissistic aids to beauty, upon youthfulness (and its consequent and attendant dread of ageing) follows upon the emphasis upon being loved, being desirable and attractive to a protector.

And we can see that for some women, who live a life of parasitic idleness in which they can find little to occupy their hands and little to give them a sense of worth outside of this limited role of being a love object, a narcissistically centered set of desires is in the foreground. This certainly does not describe the pioneer woman, the busy farmer's wife, or the competent housewife and mother who knows her own worth and who is valued precisely because of the roles she fulfills.

If we follow out the implication of Horney's reasoning, it would seem that she virtually charges Freud with taking at face value the patient's own formulation of her difficulties—a formulation that is all too frequently on the lips of certain neurotic women, a formulation that protects them from the pain of facing the real causes of their discontent. These defences serve to protect a weak and unhappy ego from the recognition of its own need for growth.

Finally, Horney reminds us that the traits Freud describes are not actually sex-linked. The male masochist and the male homosexual, the male with a weak conscience and the male with envy, jealousy, narcissistic goals, also exist. But, as in the case of women, Horney is inclined to derive their dominant trends from a total developmental situation, and to look upon their sexuality as adequate or inadequate, as properly masculine or properly feminine, in accordance with a total set of roles which have been assumed as the needs of a particular individual have come to terms with a particular setting. Instead of a stock story of development, which might be applied generally, the clinician should examine the life history of each patient, seeking the precise data that alone can furnish the understanding for the evolving character structure.

And as is the case with her evaluation of the anal-erotic personality (see page 723) Horney reinterprets the evidence derived from dream symbolism. If the dreams of the patient seem to symbolize a wish for masculinity, it is because this pseudo-goal has come to stand for a complex personal problem. Because a certain kind of interpretation can relate the dream symbol to an imputed infantile fantasy we need not conclude that the infantile origin of her present problems is proved.

In sum, Horney makes Freud's views seem to assert: (1) love is all, and (2) the penis is all. The latter she is ready to dismiss as a foolish and unnecessary postulate, one that only a male would make. But the former assertion is also short of the mark, and she believes that Freud's assumption intensifies the difficulty inherent in bringing the patient to face her problems. It is precisely such an overvaluation of the passive aim of being loved, and the secondary aim of appearing young, beautiful, attractive, intelligent, desirable, that prevents the patient from working toward a more realistic and more mature set of goals, that spoils her relationships both with men and with other women, that makes her catty, jealous, unreliable. And a similar overvaluation produces corresponding weaknesses in a male character.

Horney concludes her refutation of Freud's argument with:

"The American woman is different from the German woman; both are different from certain Pueblo Indian women. The New York society woman is different from the farmer's wife in Idaho. The way specific cultural conditions engender specific qualities and faculties, in women as in men—that is what we may hope to understand."*

THE SUPER-EGO: FACT AND INTERPRETATION

In his essay "The Anatomy of the Mental Personality," Freud reveals that his concept of the super-ego, the self-criticizing voice of conscience, took shape as he tried to understand his depressed patients, those conscience-ridden souls who seemed to be pursued by a critic and observer within.⁸ In these melancholy ones the voice of conscience "abuses, humiliates, and ill-treats his unfortunate ego." It reproaches the self for a misspent life, for faults committed long ago. More often than not the faults had been treated lightly enough at the time; but the voice of conscience seems to have been biding its time, keeping account of everything until—in one devastating summing-up—it strips the ego bare, exposing it for the miserable being it is.

And, as if to confound and puzzle the student of these matters, these very patients often experience remissions, intervening periods when they no longer seem to possess this conscience. In fact, in the classic manic-depressive cycle, the patient swings from the depressed phase into one in which he behaves not merely as if "all is forgiven," but indeed as if "all is now permitted." The hitherto critical "institution of the mind" seems to be able to assent to "the satisfaction of all desires." We have travelled far from the theological

* Karen Horney, *New Ways in Psychoanalysis* (W. W. Norton & Company, Inc., 1939), p. 119. Used by permission.

notion of a God-implanted moral sense, the same for all men, the same today and tomorrow. What we observe is a force of fluctuating strength, a censor now rigid, now permissive; and it is a force that arises gradually during childhood. While we do not expect to find it in the infant, we could scarcely forgive its absence in the adolescent. Somewhere between 3 and 13 it has taken shape, if at all, but shaped or not its energy fluctuates, sometimes turning outward upon others, sometimes swinging back upon the self.

The notion of an observer within, one who watches the ego, or of an ego watching, observing, and passing comments upon itself, raises certain logical problems, but Freud was not too concerned with such questions. How could the ego make itself an object, when the ego is the subject? These are academic questions, a modern form of scholasticism, which the grammarians may be left to puzzle over. The fact remains that the melancholiac does castigate, blame, accuse himself. In extreme circumstances he expresses his judgment of himself in the most drastic method possible. He destroys the life he despises, commits suicide. He "throws away" what others cling to. Shall we quibble about whether introspective analysis of the self, by the self, is possible, when such blatant facts demand consideration?

With other patients the self-observing function is milder, reduced to a mere chatty but continual comment upon the patient's actions. "Now he is going to say this, now he is dressing himself to go out." Or it may consist in a kind of daydream rehearsal of his actions (in the present) before some fantasied future audience, achieving important goals. Without experiencing anything approximating "hallucinatory voices" the normal person also experiences moments of self-consciousness, moments in which it is difficult for the self to do anything spontaneously. Ranging our samples in order we can now ask, with Freud, "What is the *essence* of this super-ego function? How does it originate? Whence comes its force?"

Before we face these problems we might look more closely at the series itself. We might remind ourselves of those obsessively *good* people, those anxious ones who dare not depart from a perfectionist standard, who drive themselves relentlessly with a passion for rectitude, or cleanliness, or "a full day's work," or who cannot excuse themselves for a social "slip," who brood, unnecessarily—so we think—about peccadillos. These types were especially puzzling to Freud since their actions seemed to flout the *pleasure principle* so completely. And in stating his position he had chosen to deny the existence of any basic force within us working toward perfection, or self-development. Was this voice of conscience some derivative of the destructive *death instinct*, some masochistic force which found delight in self-punishment, in self-denial, in withholding pleasure?

And these types flouted, as well, any *reality principle*, for in their extreme forms the goals of the perfectionists carry them far beyond the line of duty or of reason. So, at any rate, we say. Instead of producing an ever-more-efficient life, the preoccupation with perfectionist goals bars the road for Eros, for spontaneous and creative living, and even for simple productive work. The cleaning ritual of the anxious housewife goes beyond the demands of the well-run hospital. She covers the chairs to protect them, and then puts protective doilies on the covers. She saves her floors (or carpet) by spreading rugs, and then sometimes protects the rugs by an additional covering. Whatever protective measure she takes is n-o-o-t quite complete, a residue of anxiety persists. And when this kind of anxiety touches the moral sphere, the territory of *ought* and *should*, and when her defenses fail, then she becomes self-accusatory, then we can hear our familiar super-ego in operation. "I just can't forgive myself. It was so stupid of me," and so on. And we can scarcely warp this type of behavior to fit the pleasure-principle by saying that the highest pleasures of these persons are those of moral and spiritual perfection, of doing the job "just right"; for the fact of the matter is—as these people tell us, themselves—they get little satisfaction out of their pains. They just can't make the criterion. The standard is too high. They are chronically conscience-ridden, and even resentful about it all. "How do other people get away with it, and have such a good time?" There is even a secret envy for those who live by laxer standards. Perhaps something of this trait in each of us makes the story of *Coming of Age in Samoa* so interesting, and perhaps the feeling that we are *compelled* to do as we do by some force external to our essential being leads us also to feel that punishment (by courts, by parents, by school authorities) must be maintained lest we all "go to hell in a wheelbarrow." Our own feeling of being compelled leads us to believe that without such compulsion the pleasure-seeking id within us would destroy us (and civilization, and all the values). By some reflex of the mental apparatus those who are most willing to punish others cannot forgive themselves—when *they* fall. "I deserve punishment. I am indeed a pariah."

If instinctual cravings are the source of our strivings, if mental life operates upon a pleasure principle, how are *these* minds constructed? Having learned to recognize rationalization for what it is, and to appreciate all the defensive mechanisms of the ego, how are we now to understand these egos whose defensive outworks have been penetrated, who have permitted a "fifth column" of self-criticism to flourish within? Their self-accusatory tensions keep them striving in a way that is quite contrary to the usual manner of rationalizing the demands of the id. All such a self would have to do would

be to make the selfish act *seem* to conform to the generally accepted code. But, instead, these obsessive and melancholy ones do not even accept our proffered helps in rationalizing their performances. Oh no! They cannot excuse themselves that easily. Instead of letting their egos off with a warning they keep them on the griddle of self-accusation. There is almost a "delight in stewing in their own juice"; and yet, we use the word delight in a "virtual" sense. There is no delight in it. The general practitioner sees many of these obsessive and melancholy selves. Patients whose psychosomatic complaints have been produced because their super-ego-harried selves have found, however willing the spirit, that the flesh was weak. They are driven "beyond the line of duty"—indeed, beyond the tolerance point of their organisms. How can a mental apparatus driven by instinctive forces, forces arising from the very chemistry of our cells, forces that biology has taught us to view as conservative, pleasure-giving, protective, and productive, turn upon the very fount of its energies in such a self-destructive way? Is it the *others* who thus defeat us, or is the conflict somehow embedded within our very cellular make-up?

Dr. W. B. Titley has made a study of a group of patients hospitalized for agitated depressions.⁹ In this study he was concerned with "the pre-psychotic personality," with those more or less permanent and enduring styles of life that had characterized their behavior throughout the earlier period, prior to their psychosis. Titley found that, as a group, these patients had been shy, retiring, models of conduct, *even in childhood*. As adolescents they had been the serious type whom their elders looked upon as "old for their age"; and they were deeply concerned with right and wrong. Their conscience was unflagging, watchful. As older workers they were meticulous, dependable, diligent, orderly; and they not only seemed content with a regular routine but *sought* such patterns, adhering to ritual and precedent, resentful of change. They were frugal in expenditure, not inclined to indulge themselves, cautious in investments, late in marrying, and less desirous of having children than the average. Humorless and unforgiving of others, they were also exacting in their demands upon themselves. Partly because these traits make them uncomfortable people to have around, and partly because they themselves found little time for and even less interest in *mere* recreation, they had few friends. A bridge club that provided an entrée into certain business circles might be taken on; but bridge as pure pastime, as mere amusement, could not gain the consent of the censoring portion of this self. An over-tense physician, advised to seek relaxation in some hobby, would turn to the collecting of plant specimens, but it would be discovered that even here he approached his problem with a professional thoroughness. Underlying his

pretense of recreation was the professional interest of a skin-specialist seeking new information on pollens and allergies.

Such a group of personalities strikes us at first as fitting very poorly into any tension-reduction scheme of behavior. It is not merely that the pleasure principle is not operative (and they certainly are not sensualists), but it is also the fact that the personality structure they have built leads them repeatedly *into* tensions. Instead of abandoning a pattern of living that drives them so relentlessly into difficulties, they redouble their efforts whenever their defensive rituals are challenged. If they have difficulties, or handicaps, in achieving their self-selected goals, they do not use them as excuses, they feel, instead, that it is never right for them to give in. They must somehow rise above these conditions. They seek not the mastery of others so much as the mastery of themselves; and the peace of mind they can enjoy is not that of sated sexual appetite but, instead, the peace that arises from an inner sense of integrity. Only when the super-ego is appeased by the near-perfection of their lives can they relax. The person who is master of his own cravings, they feel, is indeed greater than he that taketh a city.

The tensions of these people are not tensions between an organism, with its homeostatic needs, and an objectively conceived outer press. Rather, these tensions arise *within* a self-system with very high goals and with a limited capacity to achieve these goals. And Freud would add, as we have seen, that this inner conflict is established prior to the age of six.

And while we are collecting our row of facts it may be well to emphasize an aspect of the behavior of these persons that we have mentioned before, for it provides the factual material that gives meaning to the three-fold split of the personality envisaged by Freud. This aspect is what Horney calls the "ego-alien" character of their behavior, the feeling of being driven, of acting under compulsion, of satisfying *them* rather than the self and its appetites and desires. This rigid, compulsive personality is full of thoughts of the excessive demands being made upon him. They are condemning him, expecting too much. Or, at any rate, this feeling is never too far from the surface, ready to bob up the moment his real performance begins to fall below the super-ego's demands. Yet the standards are accepted and somehow internalized. Otherwise, why should the willing-obedient student break his heart over his failures to come up to the standard? They are unfair, he says, *projecting* the unfairness of his own super-ego upon those who pass out the marks, *displacing* the heartbreak that originated in those internalized judges who were the primary forces in establishing his super-ego, *blaming* the outer judge rather than the inner one. This ego-alien quality of the driving force becomes more pronounced when the gap between goal and accomplish-

ment widens. When he feels his own growth and progress it is easier to say, "It is *my* will . . ."

This alienation of the self, or splitting within the self, this sense of being compelled by some other agency, is the factual basis underlying Freud's division of the ego into two parts, ego and super-ego. The third member of the trio, the id—the least organized, the least disciplined, the most completely unconscious member of the triumvirate, which completes this anatomy of the personality—is that "cauldron of seething excitement," that wellspring of instinctual energy, which exists somewhere down among the cells, originating in the very biochemical changes that "fire" the organism. The first shaping of the ego took place as some of this original energy was chipped off and given form by the blows of that outer reality which would not yield to instinctual demands. The child had to wait for the breast; he could feel the warm gush of milk into his mouth only when certain conditions were fulfilled. The first satisfactions were conditional, and as the id was forced to wait upon reality the first object was born. But if the ego is the first censor of the id (if the child is first checked and inhibited by this enforced knowledge of the nature of things) and if the first glimmerings of reason furnish the halter for the pre-existing and hitherto unbridled impulses, it is the further splitting off of the super-ego that finally leaves the ego the weakest of the trio. The poor battered ego lives on borrowed strength. Its powers were derived in the first place from the id, and the "cauldron of seething excitement" continues to exert pressure upon the ego, from below. The cellular changes (the demands of instinct) continue to prompt the ego to action; and these demands of the id are respecters of neither time nor place. Neither ego nor "reality principle" can completely "domesticate" the id. Thus, harried from below, the ego must act; but *successful* actions are limited by what is possible, by what is safe, and by what we might call the stage of development of the ego (that is, by the coping mechanisms, by the skills that diagnose and resolve the pressures arising in the psychological field). The bumps and burns that curb the exploring child shape an ego that has to respect reality. In fact the ego might well claim to be the preserver of the id, since this respect for reality is required if the id is to be satisfied—if, indeed, it is to continue to exist at all.

As if this were not enough, the ego is finally subjected to the super-ego system, the self-observing, self-criticizing function which carries the "ought and should" functions, which sets the goals that *must* be achieved, and which punishes the transgressions with a sense of guilt. Early in the process of socialization, standards are acquired and internalized—a knowledge of good and evil, an awareness of the conditions upon which one is worthy of love.

And with this knowledge the poor, harried ego has acquired three masters: an id that is as insistent as the unresting cells; a reality that will not bend to the ego's wishes but remains what it inexorably is; and a super-ego whose foundations were laid when infantile fantasies made the parents into godlike giants, and when infantile helplessness made the threat of the withdrawal of their love catastrophic, intolerable.

When the ego is still weak the id is already strong, claiming release for impulses, demanding security, and in the midst of these tasks the relationship with the parents—hitherto a source of security—begins to take on tensions. The child is expected to mature socially, to become worthy, to take a direction toward acceptable goals, to merit the love that has hitherto been so freely given.

In the beginning the child is, of course, a-moral. His behavior cannot possibly be controlled by his concern for others when, indeed, "others" do not exist, as such. Even though his overt behavior is curbed by his parents and shaped by their approval and disapproval, his behavior remains a-moral *as long as the controls are external*. His tensions and anxieties refer to what they will say and do. If he did not also love them and, finally, if he did not *internalize* them, *identify* with them, accept their goals, and repeat their admonitions (directing them toward himself), there would be no problem of the super-ego. Without this *incorporation* the controls would remain as external as they do for a foolish puppy who, when his master is out of sight, behaves in an utterly uninhibited fashion.

In the Freudian account the Oedipus complex forms the crux of the super-ego problem. The notion is not so far from the metaphor that implies that prejudices can be taken in along with the mother's milk. The Freudian account, however, relates the incorporation-process to the theory of the libido. Instinctively, the argument runs, the child's impulses reach out to embrace and to love the parental forms. And the nursing, the cuddling, the protecting arms, serve to draw out the libido and fixate its force upon human objects. Even as its impulses are being curbed and shaped, the id claims these nurturing ones as its objects. Completely, imperiously. It expects and demands magical obedience, immediate, unswerving, slave-like. Yet these others have an independent existence, they move under their own compulsions, and under their own super-ego control, which an earlier generation shaped within them. Can they permit incestuous attachments? Can they tolerate an egoist who does not mature? So the breast is withdrawn, the child weaned. So anal and urethral sphincters are made to conform to time and place. So the exploring autoerotic hand is curbed, and the meaning of "bad" is learned. So a sibling is observed receiving the gratifications and permissive care that

the three-year-old has lost. While the run-about child gains freedom and knowledge he also loses the Garden of Eden; and the progressive thwarting of libidinal claims is difficult to assimilate. What it would devour remains apart, what it would coerce exerts a counter will, what it most deeply loves and most completely desires it cannot have. Only in a virtual sense—that is, symbolically—can its goals be achieved. Even as we create a shrine to our departed loved ones (and we speak of enshrining them in our hearts) at the time of their loss, the child is building within himself that third part of the self, the super-ego. At the very moment when he frees himself from the Oedipus complex, his first libidinous attachment, he internalizes the love object. It is a striking fact, but true, that a friend who has always been taken somewhat for granted is suddenly seen for the indispensable person that he is at the moment of separation. A suitor of doubtful quality may suddenly become most desirable at the very moment when he turns away, intent upon another. And a father, suddenly killed in an accident, can assume a power over an adolescent son that he never possessed when alive. Thus, Freud believes, we can at least partially understand the internalization of the parent image at the conclusion of the Oedipal phase. The child learns, painfully, that the parents do not provide the answer to all his needs. Do not, will not, can not. Yet up to now there was little to check his fantasies.

As surely as there was an investment of id in these parents who stand outside when the internalized parent-images are formed, these surrogates will carry with them an endowment of energy. Thus a fragment of the id-energy, formed into a super-ego, begins to work against the very id that is the primal source of its power; and the super-ego begins to instruct both ego and id in what is permissible. From two sides the ego receives "commands." Even while it is trying to carry out the id's commands (and to save its life) it must listen to the admonishing super-ego. If it pays too much attention to the pressures of the id, the autistic distortions in its perceptions falsify reality and make its very attempt to satisfy the id precarious. If a too harsh super-ego fills the ego with anxiety and guilt, then the conscience-ridden ego grows rigid, unproductive. Bound to ritual and to devices that reduce the burden of guilt, its energies are so frozen that its very growth is threatened. As the source of our vital energies, the id possesses the keys to the kingdom, in one sense. If its demands are not heard then ego and super-ego will die of inanition. Sicklied o'er by the pale cast of thought, the powers of action wane, the very integrity of our sense of reality breaks up for lack of nourishment. We cannot wait indefinitely for the answers, the knowledge of reality, the skills with which to perform. A solution must be hurriedly achieved before all three "institutions of the mind" suffer.

In such broad strokes of the brush Freud paints the origin and function of the super-ego. Many details remain obscure, and his language is often so figurative, so full of personifications that, in spite of his explicit warnings, these seem to pass beyond the clinical observations for which they are but shorthand expressions, becoming "forces," entities. And the process of development is sometimes obscured rather than clarified by his language. At times he speaks as though a kind of cannibalistic incorporation of the parents had occurred. He frankly confesses: "We ourselves do not feel that we have fully understood it."¹⁰ But that something of the sort has occurred, he is certain. How the Oedipus complex is resolved, what real behaviors regulate it, and to what degree it is due to the automatic maturation of an instinctual force which develops its own "repressor," remains a dark secret even at the end of his account. What puzzles the reader most of all is his frank admission that some of the super-ego-ridden personalities were *not* ruled with harsh voices and the rod of iron. Their upbringing, Freud thought, was "gentle and kind, and avoided threats and punishments as far as possible." Nor were the parents really seducers. Nor did they actually withdraw their love. Yet the delicate balance of internal forces must have produced *fantasied* cruelties, fantasied withdrawal of love; for in their present status as clinical subjects they relate dreams and free-associations that hint at such an internalized image. The patient's harsh self-castigations imply this. The infant himself, scarcely able to think about these matters, much less able to talk precisely, must have *felt* his way into these situations with not-too-clear perceptions of what was occurring. And an answer to our questions through a study of the introspections of children who are, at this moment, going through these stages seems too much to hope for. *Now* the patient behaves *as if* he had experienced these events. It is not until the clinician, working with the free-associations and dream productions of the adult, organizes the patient's productions with the interpretative tools of the analytic hypotheses and hears from the patient's lips hints that imply and infer the shape of these super-egos, that he begins to sense what transpired, psychologically, in that infantile period.

Between the objective facts that the best possible case history can collect (the data about the details of family living) and the final conception of the adult super-ego formed on the basis of months of clinical study at this later level, there are a great many gaps and innumerable *ad hoc* hypotheses which patch together our as yet rickety structure of developmental theory.

Horney, for example, hints at the difficulty in locating specific causes for the formation of the unhealthy super-ego:

"As in any other neurotic tendency, what accounts for its development is not one or another individual feature in childhood, but the sum total of the entire situation"*

One of Freud's suggestions creates an additional difficulty. He states:

". . . the super-ego of the child is not really built up on the model of the parents, but on that of the parents' super-ego, it takes over the same content, it becomes the vehicle of tradition and of all the age-long values which have been handed down in this way from generation to generation"†

Moreover there are two parents, and two parental super-egos. Conflicting standards, and the complex triangle of relationships between the two parents and the child, make the problem of estimating the character of the super-ego from the "sum total of the entire situation" a most difficult one. An observer would have to sense the total household economy, the interplay between the parents, the relative strengths of the two identifications, the kinds of need-reductions furnished by each parent, and so forth. Again we deal with constructions that are similar to those of history, rather than science, and the hypothetical reconstructions cannot be assessed quantitatively. And when we reflect that severe forms of punishment often exist beside relatively easy-going standards, and that goals can be very simple and attainable while infractions of the rules are fraught with severe consequences, and that—conversely—an outwardly indulgent discipline can accompany a rejection of the child because of his failure to achieve the parental expectations, it is apparent that even a descriptive analysis of this period will prove difficult. We shall scarcely hope to find significant correlations between single pairs of factors.

Freud speaks of one condition that affects the maturing of the super-ego, and while it sheds some light on the process it raises questions for other aspects of the theory. Apart from the normal difficulties attending the "resolution" of the Oedipus complex—a resolution that is never satisfactory in

* *New Ways in Psychoanalysis*, p. 218.

† *New Introductory Lectures on Psychoanalysis*, p. 95. Used by permission.

This clue suggests that it is not what the parents *are* that affects this process of super-ego formation (which Freud describes as the internalization of parental images) but what the parents *value* (The lover in striving to win the love and admiration of his sweetheart senses the kind of man she would admire.) It may very well be the subtle communication, by the mother, of what her ideal man is like (not her husband, necessarily) that acts as a force in the organization of her son's goals. In fact, the very things that have remained *unrealized* in the parent's lives may be transmitted to the offspring as goals to be attained. And these imperatives are transmitted without too much consideration as to whether they are also desirable for the child, or within his capacities.

the neurotic character—there are sometimes accidental interruptions of the process caused by separation, divorce, or death of one of the parents. Freud points out the path of development that *normally* occurs:

“During the course of its growth, the super-ego also takes over the place of the parents, that is to say of persons who have been concerned in the child’s upbringing, and whom it has regarded as ideal models. Normally the super-ego is constantly becoming more and more remote from the original parents, becoming, as it were, more impersonal. Another thing that we must not forget is that the child values its parents differently at different periods of its life. At the time at which the Oedipus complex makes way for the super-ego, they seem to be splendid figures, but later on they lose a good deal of their prestige. *Identifications take place with these later editions of the parents as well*, and regularly provide important contributions to the formation of character, *but these only affect the ego*, they have no influence on the super-ego, which has been determined by the earliest parental images.”*

This somewhat dark saying contains within itself a contradiction, the unravelling of which may help to clarify Freud’s position. *Does* the super-ego change, growing more impersonal? Or is it a fixed thing, an abstracted stage of development? Does it remain exactly what it was at the infantile period when the passing of the Oedipus complex fixated, once and for always, the censoring images of the parental audience? Are we to discriminate between a censoring function, the self-observing, self-judging function—which assuredly undergoes development—and that more or less unconscious, dissociated portion of the function that was formed in infancy with the passing of the Oedipus complex? And is this latter, by definition, to be the real meaning of the words “super-ego,” the abstracted stage which—as such—can undergo no development and change and must continue even now as an independent constellation, exerting a power that reflects the strength of an earlier libidinal attachment?

As *cause*, as a set of conditions to which we would trace back some present phenomenon, it is obvious that the infantile family drama does not change, does not undergo development. It was what it then was. And if our present free-associations are so patterned as to suggest that this earlier infantile period has been an important organizer of the effects we now observe, of course we can continue to refer to this one reality

* *New Introductory Lectures on Psychoanalysis*, p. 92. Used by permission of W. W. Norton & Company, Inc. Italics added.

At any rate Freud's analysis seems to posit an existing complex of energies, an organization of the mental apparatus whose dynamic qualities were established in infancy. New knowledge of the world has been acquired since that time, new forces have arisen with puberty, new goals have arisen as we have discovered the structure of a status-ordered society, but the dynamic balance of ego, super-ego, and id, tends to persist in the form that was created in infancy, somewhere between the ages of three and six. The unconscious "nugget" formed by the repression of the Oedipal complex is still there. Every experience that overlays it takes on a structure and a meaning determined by the earlier and repressed situation.

We can now see why the death of a father, the break-up of a home by divorce, the early separation of children from their parents, will each alter the course of development of the super-ego function. *It is the what-happens-later-to-balance-and-rectify* this infantile super-ego that fails to occur in these cases. That the father is not a giant in the earth, an infallible and ever-righteous one, a perfectly self-disciplined person, becomes amply demonstrated to the child who grows up in the household with that father. The growth of the ego-function sets up an institution that both elaborates and mitigates the one formed earlier. Without the close contact with the father, within the family circle, the boy has a greater difficulty in filling in the details of that masculine ego-ideal that he needs for his own development.

The Super-Ego and the Ego-Ideal

The super-ego is a two-faced thing. It contains, on the one hand, those ideal goals toward which our actual striving is (or should be) oriented. Only partly conscious, and often quite in conflict with that sense of the possible and expected, this "ideal self" which pulls us forward is compounded mainly from the fantasied perfections possessed by those giants who were with us at that Oedipal stage of our development. But there is also a punishing, castigating, threatening aspect to the super-ego. And in the Freudian theory this hateful super-ego arises from the child's hatred of the frustrating parent, more than from the precise mode of punishment used in family discipline. This hatred, which springs from what are regarded as "threats of castration," is so intense that it cannot be tolerated by the conscious ego; for such hatred carries with it catastrophic threats. How *could* this id-prompted hatred be allowed full expression at such a tender and helpless stage of development? Unable to fend for himself or to find other equally satisfactory love-objects, this hatred had to be repressed. And in this repressed state it turns against the ego. The punishing super-ego is thus formed. Across the barrier between consciousness and the id, the forces

continue to do battle. Love contends with hate. Acceptance of standards contends with rebellion against them. The impulse to destroy contends with tender feelings (the desire to be close to). The impossible character of the id's demands did not prevent them from being made, and, once made, their denial had to be felt as a hateful threat. The hateful threat, internalized along with the introjected images of the loving and protecting parents, now stands over the ego. The ego, which borrowed its strength from the id, in the first place, hasn't the independent powers that would be required to treat this threat lightly.

Small wonder, then, that the ego frequently suffers from feelings of inadequacy, insecurity, and inferiority. The "inferiority complex" which rises out of such conflicts between the three aspects of the personality is quite different from those inferiority feelings that lend themselves to a more matter-of-fact and rational interpretation. The biological interpretation which roots the attitude in organic weaknesses (and in the instinctual and homeostatic compensations for them, see page 173) is vastly simpler—too simple, indeed for the behavioral facts. The feelings of social insecurity that mature in those who belong to a persecuted and despised minority group are also quite different from these basic attitudes of intra-familial origin, although these conditions may serve to intensify the power of the familial scene.* It is the complex career of the instinctual affection-craving impulses of the infantile id that forms the core of the Freudian idea. Freud is sharply insistent in differentiating his own view from the Adlerian type of inferiority interpretation. He points to the "historical personage" of his own time who, suffering from a withered limb, and behaving with blatant compensatory strivings, was the target of psychological interpretations which frequently used the Adlerian lingo. But, Freud points out, it was his *mother's* failure to give an extra amount of love (as normal mothers do in such cases) that converted the biological scarring into the deep-lying hatred at the root of his adult aggressions. "When the child grew up into a man of great power, he proved beyond all doubt by his behavior that he had never forgiven his mother."¹¹

Repressed, as the hateful aspect of the super-ego must be, it must act *in*

* The Jewish youth who is rejected by his adolescent peers, who experiences difficulty in getting into the professional school of his choice, and who later finds rejection of various sorts in the adult world (restricted areas, etc.) is thrown back upon the family for support. At the same time the internal conflict between ego-ideal and the evidences of growth he is able to demonstrate is intensified. He can both excuse himself (by projecting blame upon what are, in truth, real barriers) and blame himself. His proneness to fantasy a solution, to daydream a picture of himself leading his people out of bondage (a dream that is culturally supported) develops and elaborates an even more unrealistic ego-ideal. He both exalts and condemns himself.

the unconscious. Standing at the doorway to consciousness, it permits no idea to cross the threshold that would revive the original threat to the ego. Such an unconscious super-ego cannot be introspectively observed. Yet the analyst infers the existence of this shadowy figure as he listens to the self-accusations of the melancholy ones or evaluates the neurotic strivings (and the fantastic goals) implied in the words of his obsessively ambitious patients. To the ears of such an analyst, the self-observing function is badly warped; but, paradoxically, it is warped in two opposing directions. For, from his vantage point, the analyst sees the real person as both *better* and *worse* than his own statements would imply. He is certainly not as bad as his inner voice indicates, he is not actually and overtly a murderer. On the other hand, the pretences he seems to be striving to maintain, his over-reaching goals, are vastly greater than his real behavior (or the existing possibilities in the world of reality) warrant. The neurotic hostess, who cannot forgive herself for the "little slip" did not consciously want to hurt her guest, but neither is this hostess the warm and considerate person that she seems to imply. She does hurt people, she does move against them. There is something phony about her concern for the peccadillo. Even as she seems to be struggling for perfection she keeps her guests at a distance and punishes them, psychologically, in most subtle ways.

The Idealized Image and the Despised Image

Using Horney's terminology¹² we can see how this account of the genesis of the super-ego explains the simultaneous formation of both idealized and despised images of the self. They are the two poles of one process. At the same time that the impossible ideal is introjected, a wholly unacceptable and ego-threatening self is repressed. The real behavioral events which a perfectly wise and mature ego would synthesize into a realistic picture of the self are neither as good nor as bad as these two poles of the self-image imply. We are neither as brilliant nor as stupid as these secret self-images imply; nor as good or as bad as our pretenses and the sense of guilt tell us. Small wonder that the language of psychoanalysis sometimes seems to speak in riddles when the personalities it would describe are so full of contradictions.

The conflicts of adolescence, neatly summarized by Fenichel, illustrate this same ambivalent approach to the world. "Egoism and altruism, pettiness and generosity, sociability and loneliness, cheerfulness and sadness, silly jocularity and over-seriousness, intense loves and sudden abandonments of these loves, submission and rebellion, materialism and idealism, rudeness and tender consideration—all are typical."¹³ The adolescent blows

hot and blows cold. In his fantasies he is the world's greatest genius at one moment, and at the next the world's laziest, most stupid, and most worthless lout. He is the toughest and the tenderest, the most cynical and the most idealistic, the most dogmatic and positive and the most insecure and uncertain.

With two such conflicting poles of self-evaluation ever latent within us the unsure, unstable, and insecure ego is unduly affected by slight passing events, even by those chemical and cellular changes that lie outside the framework of our conscious plans. Fatigue, a passing auto-intoxication or intestinal distress, or even a mild lassitude, can facilitate the emergence and dominance of the accusing, threatening one. Conversely, a slight euphoria, whether it be the product of a deficient supply of oxygen or of a mild passing compliment, can "mean so much." We are tempted to consider those mystics who feel "absorbed into the bosom of the infinite," or those manics for whom all things seem possible, as the extremes of a process that this polarity within the self-evaluating process makes possible. If we look at the stimulating situations themselves, the responses seem disproportionate, and if we consider the sense of the real which our ego should be developing, the responses seem highly irrational and logically unfounded. But the behavior fits a formulation in which an internalized super-ego presses too heavily upon an insecure ego, producing mood-swings from exaltation to depression, from self-praise to self abasement, from one-ness with God to the pariah-like sense of banishment. And we can easily imagine how the neurotic parent whose love now blows hot, now cold, contributes to these exaggerated swings of mood and self-evaluation in the child.

The splitting involved in the formation of the super-ego is not as pronounced in the normal person. The range of self-approving and self-casting responses is not too great. Appraisals of self and appraisals of others are more realistic, discriminating, balanced. Consequently his "ups and downs of mood without apparent cause" are so mild as to escape our notice (or to be easily understood in the light of real successes and failures). Since the characteristics we have attributed to the adolescent are regarded as a normal phase of the development of the average person who, in maturity, achieves the poise and balance that enable him to ride out the little squalls of success and failure on an even keel, it would seem well to remind ourselves that the constancy of the super-ego of which Freud speaks is to be understood as a conceptual constancy, the constancy of an abstracted phase of development, or else as the constancy that is produced by a failure in the normal process of maturing. For the fate of this super-ego, its ultimate power to control behavior, its place in the total constellation of the matured per-

sonality, is *not* a fixed, preordained, and constant thing, determined once for all at the Oedipal stage when fantasied parental images were introjected. To overdo the concept of fixity would, indeed, nullify all therapeutic hopes; and it would overlook the power of current reality, the capacity to learn and to reason, the effects of reinforcing agents and of the slow attrition of extinction. It would make each phase of the maturing process simply a new version of old conflicts, an eternal recurrence of a fixed dramatic theme. Although the players change, and new lines replace the old ones, the essential thema would recur monotonously. Certainly in the normal course of events life teaches the super-ego to take its proper place. We do *not* continue to look upon ourselves as Darwin-idiot, entrepreneur-hobo, Schubert-Babbitt, but rather we come to accept ourselves as the mixture of good and evil, brilliance and stupidity, sensitivity and unresponsiveness that we are. So, too, we come to understand our parents, our love objects, our society, as mixtures, developing mature discriminations in the place of exaggerated and conflicting responses.

If Freud seems to overemphasize the constancy of the super-ego, and its infantile character, perhaps that is because in his discussions he is so frequently concerned with those who have somehow failed to mature, whose real adjustments have not brought about the proper redistribution of forces in the economy of the personality. These immature ones behave, indeed, as if they were fixated at the earlier stage, as though having never satisfactorily resolved the Oedipal phase they are like the commander with too large a portion of his troops invested in the rear, forced repeatedly to retreat at every confrontation of opposing troops.

Horney's Analysis of the Super-Ego

In her *New Ways in Psychoanalysis* Karen Horney emphasizes another aspect of the super-ego ridden personality, and her change in emphasis suggests a new way of formulating the course of its development. Beginning with the same clinical facts she notes that both the perfectionist strivings and the guilt-engendered self-castigations have a certain pharisaical character. There is something "fishy" about them. Normal people would *do* something about their behavior. But the neurotic not only does nothing, he resents the analyst's interpretations and virtually fights to retain an essentially infantile defensive position. He came, he says, for help in facing real problems, not to have his character assailed and to listen to the imputation of unworthy motives. His resistance to interpretations may take the form of an attack upon the analyst. *Your* goals are far too permissive! *You* do not know how to treat people! You don't appreciate the kind of person I really am!

Thus in his general behavior and in his resistance to analysis, Horney sees a reason to believe that the essential goal is the maintenance of a façade, a pretense of morality, a semblance of perfection. In their heart of hearts neurotics are not committed to any real change within themselves; and sometimes they reveal that there is another view of themselves that is quite different from the façade. The pretense collapses, periodically, and even when they speak in the loud voice their excessive claims seem to deny themselves even as they are uttered. They are those of whom Paul spoke, in his letter to the Corinthians, as having no charity. For all their arrogation of perfection and for all their fine phrases they were described as “sounding brass and tinkling cymbal.” In an unguarded burst of confidence these patients may reveal their own realization of the sham character of their lives. The “girl who would not eat” (see pages 157 to 161) did not see how the people at the hospital could love her because everything she did was so hypocritical. Yet for all this inward indifference and hate toward other people—which she confessed to her physician—she assumed an outward aspect of sweetness and circumspection, and she pretended to be considerate. Too sweet, almost, and too, too, considerate to be taken as genuine.

Whence this alienation from the natural self, from the stream of impulses that continually flows from the id (or from whatever sources provide our motivation)? Why is there an organization of behavior into patterns that fit *their* evaluations rather than those tensions arising from the core of one's being? Why can't we be independent of the acclaim and approval of others and do just what *we* think is right (or appropriate, or natural, or desirable)? Why must our moral striving, our work, our intellectual curiosity be shaped to fit *their* ends? Why should we *have* to struggle to maintain a façade, and in so doing not only lose the support of the deepest energy streams within us but actually pit ourselves against them so that we enjoy only tasteless victories, empty triumphs, which never give deep satisfaction because they have nothing to do with our essential needs? Why must our values be borrowed from the core of some other being? Why are the desirable goals in life either naughty, unworthy, or fattening?

The speculative attribution of the strivings of the neurotic perfectionist to a postulated super-ego whose energies are basically *libidinal*, whose threats are “death threats” and “castration threats,” whose emergence depends upon the repression that “resolves” the Oedipus complex, is rejected by Horney as both debatable and doubtful. Instead of an *agency* Horney would posit a special need, a need to keep up appearances, to claim to be what one is not. Though she would place the setting for the development of this need within that same family frame to which Freud always returned,

she would rely less upon a specific instinctual-libidinal demand of the child and more upon *all* of his needs, less upon the power of a fantasied paternal or maternal image than upon the "sum total of the entire situation"

Because of his immaturity and dependence the child cannot "stand up to" this setting

"His own individual self is stunted through being forced to conform with his parent's expectations. He loses his capacity for initiative of his own, wishes of his own, goals of his own, judgments of his own. On the other hand he is alienated from people and is afraid of them. The childhood history of a patient with pronounced perfectionistic trends often shows that he had self-righteous parents who exercised unquestioned authoritative sway over the children, an authority that may have referred primarily to standards or primarily to a personal autocratic regime. Often too the child suffered much unfair treatment, such as the parents' preference for other siblings or reproaches for things for which not he but the parents or another sibling were to blame. Although such unfair treatment may not have exceeded the average, it nevertheless created more than average resentment and indignation, because of the disparity between the actual treatment and the parents' pretenses of infallibility. Accusations arising on these grounds could not be expressed because the child was too uncertain of his acceptability."*

Thus a shift in the center of gravity occurs. Instead of springing solely from the core of his own being, his motivations now have to take into account those others *in so far as and for whatever reason they are important to him*. And the goals and pretenses of the parents are in turn derived from the larger community and from their own training. Samoa, as we saw, is very easygoing in these matters, middle-class America rather compulsive. The uncertainties of the parents, for whatever reasons, whether it is a matter of keeping up with the Joneses or a sensitivity to "blots on the family scutcheon," will be passed on to the children unless the parents have the kind of mature personalities that can contain and bind their anxieties in such a way that they are not allowed to distort their daily contacts with their children. The complex of denials and frustrations which the child may feel as a "denial of love" may be intended (or felt) by the parent in no such form at all; but rather, it will seem—if he is aware of it at all—as an enforced preoccupation with his business or professional work which his employers require, or as a training in character which the child must pass

* Karen Horney, *New Ways in Psychoanalysis* (W. W. Norton & Company, Inc., 1939), p. 218. Used by permission.

through if he is to be fitted to enter the tough world of reality, or as a means of preserving the child's immortal soul.

Under these conditions the "ideals" the child adopts, the goals he strives for, are devices to escape what he feels to be an unhappy fate. And to the extent that they are beyond both his capacities and his "willing" they can be little more than façades, attempts to *seem* worthy. In his helplessness and in his dependence he *has* to take the required line, at least he has to adopt the pretenses, the rituals, the outward signs, and he does all this more rapidly than the development of that reason which alone could give full assent. It does not follow that his needs shift so easily. Indeed, if they are in conflict with the roles those around him would assign to him, the more urgent they are the greater the threat to the superficial working arrangements that develop. Just as the irruption of genuine emotions in a marriage that is purely one of convenience threatens an adjustment that might otherwise work fairly well, the child's emotions continually upset what his parents (and even he) may consider a reasonable relationship.

Paradoxically, the probing of the friendly analyst becomes a similar threat. Poor as the adjustment of the patient may be, the release of the real motivations threatens the individual with catastrophic results. The façade is defended with all the force produced by the disparity between needs and pretenses. The "unfulfilled" forces support the status quo. The "denial" is as strong as the "denied." The façade maintains an equilibrium between contending parties who would otherwise be at each other's throats. The "ideal" (that is, the pretense) gives meaning to his life, he feels. Without it, and without the external pressures that have given a semblance of shape to his strivings, he would be lost. In a sense, he loves his prison. At the very moment when the analyst is probing to reveal to the patient the nature of that which he most deeply and spontaneously wants (but has repressed) the anxieties of the patient force him to cling to the "persona," the mask he has constructed. And if he is to abandon it, ever so little, he must find in the analyst a source of security and support.

Thus it comes about that at the time when hatred and defiance were repressed, the good (and the capacity for growth) that is in us also suffered: the imaginative and creative center of our talents was also repressed, stunted. The cave-man-within-us, the killer, the vicious hater, we suppressed; but we also suppressed the one who, with a spontaneous overflow of powerful feelings could give, love, create. Weakened, narrowed, stunted (and with undercurrents of hostility) we may come out of this period with an obsessively good façade, but we shall affect others, as Paul warned, as sounding brass and tinkling cymbal. In the very ritual of doing good we manage to

release some of the hostility that is within us. We shame and mortify and boss others, all while we profess to seek ideal ends

The outcome of this shaping process, in which there is a too rapid forcing to conform to externally imposed goals, in which the divergence between intrinsic and extrinsic motivations is too great, in which an immature organism is forced to become a mature person too rapidly (and a very special type of mature person) is a combination of haughtiness, insincerity, refined cruelty, lack of insight; and there results a lack of that deep satisfaction which springs from the inner integrity of a person at peace with himself and with the world

When we come to the concrete case study many of these unfortunate aspects of the forcing process seem to be intimately bound up with the parents' ability to give and withhold expressions of affection and support in appropriate fashion (normally controlled by an intuitive balance between affection and discipline), and Freud's original emphasis on the affectional cravings is thus reaffirmed. The emphasis is shifted, however, in Horney's account, from a single pair of instinctual forces with specific aims to a more complex interpersonal setting and to a wider set of needs *

* The affectional needs themselves become, in Horney's analysis, an expression of the way in which *all* needs are being gratified, rather than an expression of some simple unitary biological force that has remained constant over a long span of our racial history.

REFERENCES

1. Karen Horney, *New Ways in Psychoanalysis* (W. W. Norton & Company, Inc., 1939), pp. 79-87
2. Freud, "The Psychology of Women," in *New Introductory Lectures on Psychoanalysis* (W. W. Norton & Company, Inc., 1933), pp. 153-185
3. *Ibid.*, p. 185
4. Karl Abraham, *Selected Papers* (Hogarth Press, 1950), p. 333.
5. Freud, *op. cit.*, p. 182.
6. *Ibid.*, p. 180.
7. *Ibid.*, p. 154.
8. Freud, "The Anatomy of the Mental Personality," in *New Introductory Lectures*, pp. 82-112.
9. W. B. Titley, "Pre-psychotic Personality of Patients with Agitated Depression," *Archives of Neurology and Psychiatry*, 39 (1938), pp. 333-342.
10. Freud, "The Anatomy of the Mental Personality," p. 90.
11. *Ibid.*, p. 94.
12. Horney, *Our Inner Conflicts A Constructive Theory of Neurosis* (W. W. Norton & Company, Inc., 1945), pp. 96-114
13. Otto Fenichel, *Psychoanalytic Theory of Neurosis* (W. W. Norton & Company, Inc., 1945), p. 111.

CHAPTER 22

The Super-Ego: Social and Psychobiological Considerations

It is a common criticism to accuse the psychoanalysts, as a group, of over-weighting the individual, biological, instinctive factors in the formation of the super-ego as against the social and cultural factors. They are frequently accused, also, of overemphasizing the infant's experiences and neglecting the alterations in the self-system which come with adulthood. It is sometimes argued that the patriarchal, middle-class, Viennese sample from which Freud drew his patients produced one type of super-ego formation which should, in no case, be universalized or taken as the conceptual model of the basic personality structure in all cultures.

Society and the Super-Ego

Kardiner points out that the Alorese, for example, with their poor pattern of parental care, have extremely weak super-egos; that the Comanche slave and the Comanche tribesman have quite different super-egos; and that the super-ego formed on the basis of obedience is different from the one based on emulation of an ideal.¹ When the super-ego's powers are reinforced—as they are in some cultures—by the belief that “sinful” acts call down punishment, and where the training techniques involve a labelling of natural impulses and appetites as sinful, intra-psychic tensions will be strong, the super-ego harsh. When the natural impulses are accepted, and all aggressions deflected upon out-groups (or upon the impersonal environ-

ment) the intra-psychic tensions are weak and the censoring portion of the ego is robbed of its force.

In his lectures on "The Anatomy of the Mental Personality" Freud paid his respects to the materialists and the Marxists who find the causes of the changes in human institutions in the tensions developed within a system of production. While Freud was ready to see some truth in their hypothesis he felt that it neglected, seriously, the biological and intra-familial type of factors we have been discussing:

"They brush it aside with the remark that the Ideologies of mankind are nothing more than the resultants of their economic situations at any given moment or superstructures built upon it. That is the truth, but very probably it is not the whole truth. Mankind never lives completely in the present: the ideologies of the super-ego perpetuate the past, the traditions of the race and people, which yield but slowly to the influence of the present and to new developments, and, so long as they work through the super-ego, play an important part in man's life, quite independently of economic conditions"*

In this same essay Freud emphasizes the role of the super-ego in group formation. The "birds of a feather" are persons with similar super-egos, and they "flock together" because they are comfortable that way, each supporting the others in their judgments of value. The strange and different super-ego (for example, the obsessively perfectionistic one) in their midst would be a constant challenge to their own none too secure defenses. And the idealized leader provides a common, introjected father-figure for his followers. In view of the stress upon individual-instinctive-infantile factors, however, it would seem to be implied that only those can become leaders of a group who somehow correspond to and are congruent with the image of authority already internalized in the infancy of the group members.

To these analyses of Freud the Marxists are not slow to retort. The theories of bourgeois intellectuals (they say) which are incorporated into the ideology of their class are, of course, nothing more than the rationalizations of a particular mode of production and of the role of a particular class in that set of economic relations. Thus, while the psychoanalyst sees radicals, revolutionaries, and the discontented ones, as "maladjusted," "neurotic," the Marxist is ready to counter all such theories with the epithets, "decadent," "bourgeois!" In the analyses each of these makes of the other there is a striking similarity of logical structure (if not of content) and in

* Freud, *New Introductory Lectures on Psychoanalysis* (W. W. Norton & Company, Inc., 1933), pp. 95-96. Used by permission.

each an idealized self and a despised self can be seen. The in-group is viewed as composed of real people, good people, while the out-group is composed of something decadent, distorted, subhuman, abnormal. Those *others* lead improperly organized and narrowly selfish lives. If there should be a repressed beast within us there certainly could be no more fitting locus upon which to project it than "those others." They are indeed suitable as "bogey-men", and fathers and mothers who want to make their children fit to live with will no doubt use their fictional images of "these others" as horrible examples. These stereotypes will function as useful tools as they strive to curb the greedy and sensual ids of their charges. In *Yankee City* Mrs. Starr will say to her youngster who shows poor manners at the table, "You eat like a Riverbrooker!" And Mr. Flaherty will curb his daughter's flouting of Riverbrook mores with "Any one would think you're one of the Hill Street set!" Thus the family as the agency of the culture with its shared concepts and values imprints an idealized conception of the in-group and a fictionalized "scape-goat" or despised outgroup-image at the same time that the bipolar super-ego is formed. All of the distortions and departures from reality that are involved in the conceptions of the self are mirrored in the conceptions of the external reality (both in-group and out-group). Actually, we are not as good, they are not as bad. Our modes of conceiving (including our interpretations of history) are as biased as theirs. And yet, biased as they are, we affirm them (if the conditioning has been done well) and they may even serve as organizing ideas which give meaning and purpose to life. Are they not involved in that chimerical sense of destiny which groups, as civilizations, project ahead of them and follow as a cloud by day and a pillar of fire by night? And do they not serve as the defenses that prevent us from seeing either ourselves or others in true perspective? In so far as this occurs our most grandiose dreams commit us to a repetition of errors and to an ever-recurring round of intergroup conflict and misunderstanding. Thus, civilization becomes the great neurosis, its epics become the infantile fantasies corresponding to an Oedipal phase of the race. The "institutions" of the individual mind and the institutions of society form one interlocking system.

The Super-Ego and the Real

It is possible that the psychoanalytic account of the development of the super-ego can lead us into error; for the one *real* situation constantly emphasized is that of the infant in the family. All that happens subsequently is recurrence. The repressions of the Oedipal and pre-Oedipal period determine the balance of forces at later stages; for these repressed impulses continue to determine the processes on the conscious plane even in adulthood.

The super-ego does not develop; its force is merely applied over and over. A static rather than a dialectically developing relationship has been posited. It is true that we can see some force in this emphasis when we consider the fixations, the infantile personalities, found among neurotics; and it has the force of the common sense observation that "as the twig is bent the tree is inclined."

But life is not over at five. There are play groups, work groups, adolescent cliques. The Negro child has to meet the hard fact of racial prejudice, and the Riverbrooker has to experience the contempt of his teachers and of the school authorities. Marriage, family responsibilities, job-seeking, and adult citizenship are also real situations, and while every redistribution of energy within the self-system has to be made on the basis of previously established structures, we need to consider both the conditioning power of these new impacts and the changes in the maturing organism. There is a real force and novelty in these new impacts. They not only pull up bits of the past, they also reorganize these bits. New pressures arouse new need-tensions, and new capacities and skills provide coping mechanisms. Thus the infantile dynamisms are stirred, recombined. The ego grows stronger, its sense of the possible changes more realistic, more adequate. These new balances between tensions and coping mechanisms could not have been predicted from any analysis of an earlier distribution of energies. No wonder the analyst hesitates to advise parents as to how they should proceed in order to prevent later neuroses. It is not merely because the interactions between the infantile id and real parental behaviors are so very, very, complex, or that parental neuroses would falsely interpret and utilize even the correct advice. It is also because the story of development of the personality structure is *not* an eternal recurrence of themes set in motion in infancy. Both ego and super-ego evolve as development proceeds: our conceptions of the moral order and of the nature of adult justice are as far from the evaluations of infancy as astronomy is from the child's conception of the moon. The institutions of the mind are simply not fixated upon infantile levels. In fact, the error seems to consist in looking upon the super-ego as an institution. It is a process. The self-observing and evaluating process undergoes development with every advance in knowledge, with every succeeding experience of success and failure, with every well-loved group that judges our actions.

Perhaps these considerations help to explain why so many psychoanalytic excursions into the field of social psychology sound like "just-so" stories. They have as yet done too little in the way of analyzing the particulars of the later phases of development, the real situations that produce real modifications in the developing self-system. Without these studies their pronounce-

ments remain arm-chair speculations; and the categories of infantile psychology will be heavily burdened. It seems foolish to call war a regression to an infantile state in which the super-ego relinquishes its power of censorship to external authorities and, in so doing, regains permission to hate, kill, destroy, as it once did in infantile fantasies. We need to know more precisely the sequence of events. Nor does it help to describe revolution as due, basically, to the Oedipal wish to kill the father, a wish most fully typified in the paranoid homosexual revolutionary leader. Such psychological jargon would overlook the web of relations in a real society, relations that daily alter the distribution of power in every individual self-system, changing the balance between egos and super-egos and ids. When the analytically minded commentator looks upon the rise of Hitler and sees an abnormal infantile sexuality in the character structure of those who first and most ardently followed him² we are substituting name-calling for history, substituting fragments for wholes. The social speculations hinted at in these samples are not supported by the kind of labor that builds a science of society. The concepts are loosely used, they brush over extremely complex events as though detailed knowledge of these periods was unimportant, and they completely neglect the real world. This is "psychosophy," not social science.

When the life of the individual in society is conceived of as that of a blind one who moves among the projected shadows of an infantile and archaic past, unable to discover anything new or, on his part, to develop, then indeed we need give little attention to the social realities that impinge upon him. Living is then a mere recollection of an archaic self. And when Freud, and especially Jung, let their poetic imaginations include in this archaic self a primitive racial past, then the world which has shaped our minds is placed beyond the scope of any scientific validation. Life becomes an eternal recurrence. Like a Hindu we see this life as affected by our earlier existences. The known and visible is explained in terms of what is invisible and unverifiable. And the possibility of therapy seems to have vanished with the loss of a creative rationality.

If a personality structure is a fixed thing insight is equally bound and fixed. The therapist can scarcely claim that in a few short hours he, and he alone, can undo what years of living have not undone. If the discounting of the importance of experiences in the later years leads the therapist to neglect the current sources of real tensions and the possibilities of therapeutic and maturing effects in the adult milieu, does it not also discount any value in the experiences of the analytic hour? Will not the dependent and infantile neurotic draw from these contacts merely what suits the needs of an immature and dependent person? And will not the institutions of his mind remain

fixated in that position from which all real events have so far failed to dislodge them?

• Not only does such a view nullify therapy, it discounts in advance all broader programs of social reform, except possibly in so far as these touch the structure of the family and the basic techniques of child care. Unless we believe that the analyst has discovered, in his method, a kind of psychological touchstone capable of transmuting the baser human materials into "normals," we shall have to resign ourselves to a profound pessimism.

At the same time that we voice such criticisms we should be prepared to admit that the simple manipulation of the objective situation, which a naive conception of conditioning principles might lead us to adopt, is also inadequate. The most logically presented explanations and the most carefully applied guidance principles are not easily accepted by the neurotic, even when he professes to seek help. Nor will moral suasion, alone, suffice to bolster his super-ego. (In most cases he will have experienced enough of this from his family and friends.) Freud developed his principles through the discovery of the limits to the use of suggestion, simple catharsis, logical explanations; and he learned—probably to his pain and chagrin—that until the patient is ready, until he is made to *feel* in a new way, the ordinary measures do not work. There is a real basis for the analyst's pessimism. A character-structure does not readily yield to our ordinary procedures.

Returning again to the social factor, one has the conviction that the analyst is right in seeing the *relative* unimportance of social status in shaping the basic personality structure. To be sure, the loss of reputation, honor, possessions, and the like, is a most severe blow to a self-system, releasing—in some—suicidal tendencies. To be sure, the dislocation of aims and expectancies in the European concentration camps, the severing of all supports, that occurs when displaced persons are cast adrift by war, lead to the all-but-complete disorganization of many personality structures. But it is also true that both king and commoner can have closely similar personality structures, that neurosis is no respecter of rank. King and commoner can be anxious, hypochondriacal, or conscience-smitten; or they can be placid, hearty, or lusty. One does not have to be a Prince of Denmark or the Thane of Cawdor to identify with Shakespeare's characters and to sympathize with their internal conflicts. There is something quite superficial in the attempt to identify a personality structure with a point on the socio-economic map.

It is possible that research may reveal *modal* personality structures that cluster about each point on the socio-economic map; but a one-concept theory of the personality structure, based solely upon, say, the relations entered into as worker, owner, producer, is also too simple. It would seem that

we are in need of a great deal of reciprocity at this point, a collaboration of many workers who will consider all the relevant facts, biological, psychological, sociological, intra-familial, intra-clique, and so on. By the same logic the analysts who would explain all moral values and all social institutions (property, currency, war, revolution) by means of concepts resting solely upon an analysis and interpretation of the free-associations of the neurotic individual—weighting his infantile past—are equally guilty of overworking a one-dimensional analysis of a multidimensional reality. The so-called “anal-erotic” character, whose stinginess and tendency to squabble over property are traced to repressed conflicts established at the time he underwent toilet training, is scarcely an adequate paradigm to which to relate the transition from mercantilism to our present industrial economy, or to which to turn for the kind of insights that will enable us to deal with the problems arising in an industrial community. If the network of productive relations that controls the flow of goods guaranteeing us food, shelter, and clothing, exists as a kind of “social id” affecting all other relations, then they also affect individual id-systems just as those intracellular structures with which the comparative psychologist explains animal motivation. What the research on psychosomatic disorders does to correlate the psychological and physiological factors must be duplicated at the other end of the conceptual continuum. the social and anthropological, the economic and psychological, the physiological and biological studies must all be correlated, eventually, into one life science in which the concepts of one division of studies are made to mesh with and to stimulate the development of concepts in other divisions. Then a truly multidimensional type of analysis will be possible. We have scarcely begun.

THE PSYCHOPATHIC PERSONALITY: A SELF-SYSTEM WITH A WEAK SUPER-EGO

There is a diagnostic category that has been employed by clinicians since 1835, when Prichard first isolated and defined a type of *moral insanity*. The boundaries of the field marked out by this concept are vague and difficult to define; and in spite of repeated attempts to re-assess the significance of the concept it remains one of the least satisfactory in current clinical practice. As Prichard described it:

“There is a form of mental derangement in which the disorder is manifested principally or alone in the state of the feelings, temper or habits. In

cases of this nature the moral or active principles of the mind are strangely perverted or depraved, the power of self-government is lost or greatly impaired and the individual is found to be incapable, not of talking or reasoning upon any subject proposed to him but of conducting himself with decency and propriety in the business of life.”*

Many of the definitions of the state are given in negative form and diagnosis consists in a process of exclusion. Thus it is said that the psychopathic personality is a self-system that has failed to take shape, has not developed a regnancy capable of curbing the momentary impulses. It is a character structure in which the super-ego is weak and ineffectual. The case history commonly shows no measureable or pronounced deficit in intelligence, as defined in the usual testing procedures. Yet in the broader meaning of intelligence he is markedly defective. he fails to profit by experience; recurrently his bad practical judgment lands him in difficult predicaments. Psychiatrist and case-worker find him unresponsive to the usual remedial and therapeutic endeavors. His grasp of reality is weak, particularly that reality we call social. He lacks foresight, insight, and that type of organization of his impulses which enables him to control, inhibit, and improve his overt adjustments. Flighty, irresponsible, immature, perverse, with little regard for the standards of honesty and decency shared by his peers, the psychopath does not seem to have taken on those standards of the culture that have made man truly human. He does not show the characteristic make-up of the neurotic (or if symptoms so classifiable are present they are in addition to his psychopathy) and he is not insane in the certifiable sense.

Preu describes the conditions under which a diagnosis of psychopathic personality should be made: (1) outspoken social maladjustment that has been (2) chronic and resistant to treatment, and (3) that is not attributable to defective intelligence, organic brain disease, epilepsy, neurosis, manic-depressive or schizophrenic psychosis.

No single symptom appears in all the cases diagnosed as psychopathic personality. The borderlands of this territory are therefore shifting—comparable, logically, to the shifting lines defining such a concept as *race*. Yet there is a recurrent constellation in which the lack of social responsiveness, the chronicity of maladjustment, the inability to profit from experience, form a common core.

With such a constellation of traits before him it is not surprising that the

* J. C. Prichard, *Treatise on Insanity* (London: Gilbert and Piper, 1835). Quoted in Paul William Preu, “The Concept of Psychopathic Personality” in *Personality and the Behavior Disorders*, ed. by J. McV. Hunt (The Ronald Press, Inc., 1944).

clinician should not be able to discover a single and simple cause for the disorder, or a clear-cut understanding of the dynamics of psychopathy. In view of the obscurity of causation, the chronic character of the disorder, and its resistance to therapy, it is not surprising that many clinicians have been prone to couple the term "constitutional" with the diagnosis, referring to a *constitutional psychopathic inferiority*. Added to these considerations is the fact that the psychopath occasionally appears in "good" families along with normal siblings. He is the "black sheep" who, somehow, does not conform to the family model. The forces that produced his normal brothers and sisters were without influence in his case, or else varied in such subtle ways that trained observers are unable to detect the differences, and in the absence of a clear-cut understanding of the etiology it is easy to fall back upon some "constitutional" factor which determines the destiny of the psychopath. This concept of a biological destiny relieves both the harassed clinician (who finds that his therapeutic efforts are so frequently hopeless) and the anxious parent (who asks himself "What could I have done to produce such a child?"). If the pattern can be attributed to some obscure combination of genetic or physiological events, then both are freed from an embarrassing situation.

Evidence from recent studies of the "brain waves" of psychopaths has added its weight to the constitutional approach. Samples of criminal psychopaths, behavior-problem children, and of adults who have been referred to psychiatric clinics for diagnosis and treatment have yielded electroencephalograms showing abnormal fluctuations in electrical potential in from 35 to 75 per cent of the cases. Low amplitude slow waves are found, waves that contrast sharply with the normal, 10 per second *alpha* waves.⁸

Many other clinical findings fit into this constitutional approach. For example, personality changes have been noted in children following acute epidemic encephalitis. This disease is infectious. Caused by a filterable virus it sometimes results in lesions of the central nervous system (especially of the sub-cortical centers and mid-brain structures). Outwardly similar, in symptoms, to influenza, it may pass unnoticed or be treated as a cold. Sometimes profound behavior changes follow. Irritability, excitability, aggressiveness, apathy and semi-stuporous states. And the electroencephalograms (EEG's) are affected.

Among the behavior-problem children there are those whose brain waves resemble one of the forms of epilepsy. Yet they are not subject to the typical attacks; instead there is a "behavior storm" with tantrums, aggressive outbursts, bursts of impulsive activity. The impulsive and unrestrained be-

havior of the psychopath, his lack of normal controls, fits easily into the hypothesis of some underlying brain damage O'Kelley states the hypothesis in these words, defining the disorder as "a combination of deficit, compensation, and release symptoms accompanying particular types of organic brain defect, possibly occurring either in fetal life or during early infancy in the majority of cases"⁴

Against an unqualified acceptance of the hypothesis are these facts: (1) many non-psychopathic normals also show abnormal EEG's (15 to 25 per cent) and (2) not all those segregated, clinically, as psychopathic personalities show abnormal EEG's. Moreover, before we accept the EEG's that are found as evidence of an original somatic basis for psychopathy, a brain condition that makes the learning of normal social adaptations difficult, we shall have to know much more about the range and variety of conditions that produce the abnormal EEG's When Dr Silverman examined the life histories of his criminal psychopaths who showed such a high percentage of abnormality in the EEG (53.4 per cent abnormal, 26.6 per cent borderline, 20 per cent normal) he also found a veritable "kingdom of evils" in their early background broken homes, alcoholic parents, faulty discipline, frequent uprooting and moving from place to place, and the like We might wonder whether the forces that disorganize the personality in its very early formative years may not also result in abnormal EEG's *

While all clinicians agree that the psychopath is the most difficult of all personality types to treat (outside of the psychotics, the legally insane) there is reason to reject an attitude of complete hopelessness

Dr. V. V. Anderson summarizes his experience in treating such children at his school in these words:

"For over some twenty years, I have had at the Anderson school some youngsters that fitted quite well into this category. . . . In some cases I have been unusually well pleased with the results attained Probably the most important item in my thinking of the treatment of these cases was the element of time If we were able to keep them long enough with us, we seemed to make a dent that was favorable I remember one boy, referred by one of the best-equipped psychiatric centers in this country, with a letter of apology stating they had tried out every available method and had placed him in many different situations that should have had therapeutic value, with no results. He would run away, was destructive, unresponsive and, as they said, had no

* It would certainly be an example of paralogical thinking to urge organic brain defects produce abnormal EEG's, some psychopaths have abnormal EEG's, *ergo*, psychopathic personality is a character organization founded on an organic brain deficit.

superego; the parents added, 'impossible' His father, a prominent lawyer, persisted however. This boy ran away from us four times, ultimately responding pretty well during his last two years in the school. He finally became one of the key men of the government group of the school, an honor student, and graduated with many honors. He entered the armed services, was repeatedly decorated and became a very respected officer in our army. Other than the fact that he seems to have had trouble with several wives or near wives, his adjustment has been quite good. I could tell of quite a number of youngsters with whom the elements of time, patience, and a sensitive workable environment, under close psychiatric guidance, have been beneficial. These individuals present a fairly well-defined personality picture. They are not particularly amenable to psychiatric therapy, as commonly understood, but an environment with a cultural-social pattern that is tolerant, not too rigid, and that can be manipulated on a daily basis by the student's guidance man in keeping with his needs, an environment that offers many and varied activities, interests and a full life, plus the type of guidance that also adapts itself, on a daily basis, to the attitudes presented by the individual, has worked out over a period of years quite successfully in a good number of cases. Fundamental to our point here, as I previously said, is a long-time viewpoint, and the chance to achieve personality growth, maturation and integration."*

Some of the case histories of psychopaths remind one of Dr. Levy's "infant monsters" who developed in a setting of indulgent overprotection. The child's formula seems to run: "She loves me. I can do everything and anything any time I want." The wayward impulse emerges unchecked and ego-centric pleasure-seeking is uncurbed. The "other one" does not emerge as the one who stands for something, as the one whose love might turn away; and as a result neither a clear sense of standards to be achieved nor a sympathetic awareness of the hurt inflicted upon a loved one emerges. The notion that "human love needs meriting" is not learned. We need to know more about such a mother, to explain her needs for the affection of this child, needs so strong that the youngster could virtually "blackmail" her into conformity with his will.

Other types of parental discipline are found in the histories of psychopaths. The extreme instances of rejection, of excessive and severe discipline and restriction, and the cases of such inconstant and fluctuating types of control as to make the observer suspect psychopathy in the parent, are found in more than average frequency. Many students of this field have

* V. V. Anderson, "The Psychopathic Personality in Childhood," *American Journal of Orthopsychiatry*, 20 (1950), pp. 259-260. Used by permission.

commented on the frequent appearance of one overindulgent parent combined with a parent who is extremely severe. None of these family frames fits the demands of good learning. Building in habits of self control, of consideration for others, of fulfilling promises, of living up to standards, requires a stable learning situation in which restrictions and rewards are balanced, where standards are adjusted to the learner's ability to achieve, where discriminations are clear-cut. The trainer must respect the needs of the child, and the child must be taught respect for his milieu. Standards that are too severe or too erratic tend to remain external and merely coercive; they are not built in as a part of the self's own need-system. If, at the indulgent extreme, we observe that "love is not enough," at the opposite extreme we need to remember that "coercion is not enough." Without warmth and affection values do not become well-loved, incorporated; it is not easy for the child to identify with the parent.

When we have thus typed the parental controls (indulgent, rejectant, inconstant) we still need to recall the infinite variety of concrete family settings which can affect this early development of that regnancy which controls our impulses.

There is the career mother whose pregnancy interrupts her life-plan and whose resentment enters into her handling of the child. Her own super-ego may make her repress such resentment and her "reaction formations" (which assure her that she really is the good, loving, mother) make her over-solicitous, over-indulgent.

There is the weak father whose role in training gives the boy poor "copy" from which to fashion a conception of the good man, the ego-ideal.

There is the strong father who sets an impossible set of standards or who, through preoccupation with his own struggle for a place in a competitive world, can share little time with his children.

There are the parents whose own life styles and childhood experiences have provided such radically different conceptions of discipline that the impact upon the child is inconsistent and erratic. He can play both ends against the middle.

There is the neurotic parent with excessive needs for affection who bribes the child with indulgences, hoping to win an ally, to earn gratitude and affection, arousing in the child expectations that cannot possibly be fulfilled and receiving finally the hatred of a frustrated egotist.

There are those homes about to break up, where the family battle revolves around the child, and where a mixture of fear, hatred, love presents a problem too great for the parents, let alone the immature learner.

There is the psychopathic home where one or both of the parents is so unstable (and possibly anti-social) that even if the parental standards could be internalized they would not provide an effective conscience

There is the "mixed home" containing parents, grandparents, nursemaids, and other relatives, particularly when the "life-space" of the child is restricted and crowded Too many, too careless, too confusing "bosses" weaken the force of any one of them Where a mother works, for whatever reason, and turns over the child to a succession of indifferent mother-substitutes, a similar effect is produced.

Whatever our stereotype of the happy home, and whatever our notions about the filial piety that should come out of a normal childhood experience, the phrases we hear on the lips of the psychopathic personality indicate that in his case the outcome is different.

"I hated my father, and when I smashed his new car that I had stolen I was glad."

"I didn't hesitate to cause her (mother) expense in other ways I often broke dishes and stopped up the pipes several times, knowing that it would cause her expense. I blame my mother for those early thefts . . ."

And the psychopathic mother is equally far from our stereotype of motherhood.

"I like children but I don't want any of my own"

"I don't like babies unless they are very tiny, like bugs."

"I don't know what the word 'love' means in my family My mother wasn't one who would put her arms around you and there was no sisterly or brotherly love."

"A year after marriage a daughter was born With a child I thought I would have something to be interested in I was very much so at first but it soon cooled off I was never very maternal."†

Love and Guilt in the Psychopath

The psychopath impresses us as one who has just missed being human The descriptions of psychopathic behavior fill us with a sense of something hollow, devoid of real affection The psychopath can only *simulate* human behavior One of the most amazing aspects of psychopathy is the persistence—in spite of all the defects in his makeup—of the capacity to enlist aid His

* Ben Karpman, "Conscience in the Psychopath," *American Journal of Orthopsychiatry*, 18 (1948), p 473. Used by permission

† George W. Henry, *Sex Variants* (Paul B Hoeber, Inc , 1948), pp. 694, 655, 632. Used by permission.

expressions of contrition and anxiety deceive many; and he is able to find support time after time. But his simulated "love" leaves a trail of disappointment behind him.

Writing from prison to a girl he has never seen, one young psychopath begins:

"Dear June,

"Of course you know my cousin, David! Well, I had a long talk with him about beautiful women. He said that you are the most beautiful thing on earth. The way he described you he made me think that I've known you all my life. You must be a second Jean Harlowe. I've dreamed about you, from the very first day he told me I'd give a million dollars to have you in my arms. Sometimes I think I am in love with you although I've never seen you. Maybe someday I will see you. June, my darling, I love you. I love you with all my heart and soul. Please believe me?

"June, my love, although I've never seen you I would like you to be my wife. I have lots of money and life would be a bowl of roses for you. I know that you will never regret it. Because I will make you the happiest woman on this earth . . ."*

Another, with a long history of truancies, thefts, desertions, writes to a friend of the family for advice and help, concluding his letter with the lines: "I realize that I've no right to press you, nor to expect clinical advice from you. Yet if you could know the anxiety under which I live I'm sure you would not feel that I am too presuming. Do not hesitate to give me hell if you feel I merit that." Yet his "anxiety" did not prevent him from resuming his psychopathic career once he had been released from a federal prison. His very wording seems to reveal that the scolding he anticipates is something that someone else may feel that he merits. (" . . . if *you* feel I merit that ")

The "love" the psychopath refers to is not the love that binds, nor is it the unselfish love that puts the needs and interests of another on a par with one's own. Or, if this be love, we shall have to admit that love can be greedy, ego-centric, devouring, shallow, inconstant, narcissistic, and wholly unconcerned about the growth, welfare, or happiness of its object. It is tempting, in discovering this absence of a mature type of love in the psychopath, to excuse this absence by looking upon him either as a person constitutionally incapable of achieving it, or as a person who has lacked the experience of an unselfish love in childhood. Surely, we say, any normal child would respond to love with a return of affection. And there are many case histories that sup-

* Ralph S. Banay, "Immaturity and Crime," *American Journal of Psychiatry*, C (1943), p. 171. Used by permission.

port this interpretation: psychopaths who were rejected as children, who came out of homes that were confused, hostile, cold, severe. And we conclude that only the warm, accepting, loving, home can convert the impulsive, unshaped, infantile organism into a properly maturing human being.

The overindulged child who develops into an adult psychopath should remind us that a parent's "love" does not magically evoke its counterpart. Neither does the existence of real sacrifices, steady concern, repeated forgiving, always build in a "parent-image" that has the power to create gratitude, self-control in the child.

To describe the psychopath as without a super-ego, as suffering from an improperly resolved Oedipus situation, locates but does not resolve the problem.* If we recall the origin of the concept of the super-ego and realize that the absence of a super-ego would mean the absence of a self-observing function, we shall find less advantage in this description. The psychopath has a super-ego of a sort, but it is unrealistic, shallow, and it neither binds the impulses nor produces a sense of guilt strong enough to motivate improvement in conduct. Like the ne'er-do-well who, all his life, has dreamed of finding money, of making the big killing, but whose haphazard drifting from one project to another indicates how feeble the pulling power of his dreams really is—and how utterly unrealistic—this super-ego lacks "punch." He can verbalize good intentions glibly enough, but these good intentions are no more than those paving blocks mentioned in the well-known proverb. The ego-ideal can be *high* enough—as a verbalized goal—but, like the "love" of the psychopath, it does not motivate his conduct. It is apt to be far removed from actuality and so far beyond the real coping mechanisms that training has developed, so far beyond the slender resources in self-discipline he has achieved, that the easier ways of imposture, of criminality, or pretense and false promises are chosen. It is not that the self-observing function is absent but rather that the super-ego is a sham one, the ego-ideal

* Karpman, out of extended analytic experience with psychopaths, reports that in the "true psychopath" there is no evidence that an Oedipus complex has ever existed. These "anetopaths"—as he calls them—constitute but 15 per cent of those commonly classified as psychopaths, he believes. The remaining 85 per cent he prefers to call neurotics masquerading as psychopaths. Behaviorally, the latter are very much like the true psychopath, but beneath their veneer he finds true guilt feelings and the Oedipal conflicts that characterize the neurotic. Only after many hours of interviews and prolonged effort to crack the tough (and slippery) defenses can a transfer be established. When patience and skill are exhausted, when perhaps a thousand hours of analytic interview have been completed, when complete failure to penetrate to a responsive core of the personality has been recorded, *then* the diagnostic label "anetopath" can be given. Since no therapy succeeds, since no clear-cut psychogenesis can be found, constitution and heredity may be called in. Thus the "true psychopath" becomes a diagnosis by exclusion, a diagnosis by virtue of failure of all therapy.⁵

phony, the awareness of the self as distorted and limited as the awareness of reality as a whole. Since the rest of us share in these imperfections, perhaps we should say that the difference between the psychopath and the normal is one of degree.

At the extreme end of the continuum these "talking anthropoids" are indeed difficult to handle, difficult to understand. They test the clinician's power to accept and sympathize with his patients. "The therapy of mental disorders affecting incorrigible people is rough going," Sullivan writes. "It is feasible only if one always knows what one is doing. The effort required in extreme instances, however, is not ordinarily available."⁶ And Karpman notes: "You can teach a bear tricks, but you cannot domesticate him or implant in him even the rudiments of conscience. The true idiopathic psychopath is no more trainable than a bear, for he appears to lack the capacity."⁷

When the story of the psychopath is concluded perhaps we should confess our own bafflement. Honestly, we do not know. Consider the following possibilities:

1. *Constitutional factors?* He is constitutionally incapable of learning to internalize and to live by the ethical code. His "behavior storms" are like the epileptic attacks, yet at a milder degree of intensity and manifesting impulsive anti-social acts rather than the reflex type of convulsions of grand-mal, or the simple "black-out" of petit mal. The appearance of atypical encephalograms in from 35 to 80 per cent of the cases diagnosed as psychopathic personalities strengthens this interpretation—as does the lack of response to therapy.

Yet there are psychopaths who show no measurable deviation, neurologically, and there are psychopaths who recover (as brain-injured do not).

And his inability to "profit by experience" applies to the interpersonal field, only. The psychopath is no dullard at his studies. Since "living by the code" is also a learning, we are at a loss to understand how a defect in a capacity to "profit by experience" can be so highly selective unless interpersonal causes in the history of his development have set up selective barriers, fixations, generalizations, that block progressive discrimination and integration.

2. *A defective super-ego?* He represents a self-system without a super-ego. Conscience-less, he experiences no guilt, and his ego-ideal is either absent or so weakly integrated with the rest of his dynamisms that it does not pull, inhibit, direct. Without a regnancy the psychopath neither delays, inhibits, nor represses; but he moves with the passing impulse. Some psycho-

analysts have described him as the "impulsive character" (*triebhafter character*) yet there is no evidence that his impulses and appetites are any stronger than those of the normal person. Some case histories seem to imply actually a feebler set of impulses. It is, rather, that in the absence of the regnancy, of the capacity to regulate and confine these impulses, even his feeble impulses lack normal restraint. He is defective in his power to inhibit. Hence he "acts out" even his weak impulses.

In psychoanalytic theory this amounts to a denial of the presence of an Oedipus complex. A failure to pass through a normal phase of development represents an anomaly that is hard to account for. Many have suggested that a constitutional basis is involved; but until the nature of the constitutional defect is clarified the mystery is simply deepened.

Other psychoanalysts see the psychopath as suffering (as all other neurotic manifestations do) from improperly resolved Oedipal conflicts. He is rejected, he is hostile to one of the parents, he has been subjected to inconsistent and self-contradictory disciplines. In short, he has not experienced that normal balance of discipline and affection which shapes the normal character and enables the developing child to internalize the values and goals of parents and the culture.

3. *Failure to learn to adjust?* The implications of the treatments proposed point to the simple business of learning adequate interpersonal adjustments. If, patiently, through many months of well-regulated institutional life, with understanding and patient guidance, with goals that are neither too rigid nor too high, with a steady training in ways of coping with the problems of group life, with opportunity for growth and the satisfactions of normal needs, a psychopath can be converted to an acceptable member of the group, then his earlier failure to reach this goal must have been due to the absence of these conditions of good learning.

The learning interpretation is reinforced by the large number of psychopaths who come out of an environment that is a virtual "kingdom of evil." Instability, rejection, faulty discipline, and the kind of "copy" furnished by a dilapidated (and even criminal) social environment can scarcely produce anything but the weak and phony type of super-ego, or ego-ideal. Banay's young psychopath wrote:

"I am six feet tall, weight is 190 lbs., light complexion, sharp and always in the chips. I can take you anywhere you desire. Money doesn't mean a thing to me. You can have anything your little soft, warm heart desires. I own a cafe on Seventh Avenue. Business is very successful. Money flows in

like a bristling brook. I have an apartment and a 1941 Chrysler convertible sedan, black with white-wall tires. Everything works by the push of a button. Life will be a luxurious one for you”*

What does he need for an ego-ideal that the movies or the street-corner environment cannot furnish? Sharp fellow, in the chips, and a life that answers the push of a button! Small wonder that these phony super-egos provide little force; for the world is not such an easily cracked oyster, and the ego without coping mechanisms cannot project and realize its goals by legitimate means.

The psychopath who comes from the “good” home is less easily understood in terms of learning theory; and if his brothers and sisters have achieved normality in this same environment, the difficulty is intensified. Yet we know that the environment is never the same for every child in the household. And the “good” father who is a successful and respected citizen may be over-strict, aloof and indifferent to his child, insistent upon impossible and perfectionist goals. And when his wife, the mother, is weak, or flighty, or overindulgent, or excessively in need of affection (which she demands from the child), or if there are conflicts over discipline, or if there is more indulgence than concern for the hygienic maturing of the child, the “good” environment turns out to be less desirable than a superficial view would imply.

More often than not the psychopath’s difficulty is not due to the fact that he has not learned those ideals and values that are desirable to achieve. He can name them. Indeed his very fluency in enlisting aid and in rationalizing his own impulse-ridden acts depends upon this knowledge. But they are known as one “knows about” a foreign culture. They are not a part of him, internalized, accepted, identified as his own. They remain the goals of *those people*, whom he can scarcely understand or sympathize with. Or they are objectives that would be too costly (in terms of the loss of immediate pleasures). Only says *work*, he feels. They are strivers and strainers; indeed, they are suckers. Thus the psychopath lacks both the “ways and means” and the intent to realize these objectives. He seldom seeks therapy or even realizes in more than the most shallow fashion that anything is wrong with him.

Moral Force and the Psychopath

Every gain in moral progress yields a residue of moral force that is available for the next task. Every strengthening of a regnancy adds to the repressive-inhibitive power of the self-system, and to its own powers of

* Banay, *op cit.*, p. 171. Used by permission

realizing its goals. The psychopath never makes more than a beginning on this cumulative-integrative sequence.

An English divine, describing man's lot since Adam fell, once wrote of him as "the wayward, fretful, excitable, and miserable being with alternate strength and feebleness, nobleness and meanness, energy in the beginning and failure in the end."⁸ The "energy in the beginning and failure in the end" describes the psychopath who is full of false starts but makes a poor delivery and lacks persistence. He envisages easy victories and pots of gold at the end of every plan.

But he scarcely fits the "miserable being" part of the description. The psychopath insists: "*They* shall suffer, not I. They are to blame, not I." Without a "stay," without a solid core of values or persistent ties to which he is committed, the weathervane intellect of the psychopath makes a fresh reconstruction of reality and of himself at each new turn, a reconstruction that fits his present impulses. "For several reasons," one psychopath blithely wrote to his counselor, "I have altered my case history. Not the facts though—merely the phrasing and method of coming to the point . . ."

If the psychopath possesses human weaknesses in a more generous proportion than the rest of us he is still on the continuum that contains us all. In some respects he deserves as epitaph the title Nietzsche used for one of his essays: *Human, All Too Human*. Perhaps he irritates us so much because he reminds us of our own weaknesses. He is the one of whom we do *not* wish to say, "There, but for the grace of God, walk I." For we know these weaknesses and have long fought against them. We would rather believe that he is a creature apart, a "talking anthropoid" who, through some constitutional defect, has just missed being human.

No deviate from the norm deserves more serious study than the psychopath; for his deficiencies illustrate in a striking degree the deficiencies that haunt every man. He is the human being with the smallest area of freedom. He cannot make promises and fulfill them. He cannot see himself as others see him. He cannot profit by experience in such a way as to grow in moral stature. His is the weathervane intellect veering with every gust of appetite. He is the glib self-justifier. He is virtually without moral force. He cannot experience tragedy or any emotion powerful enough to transform or to purge his nature. Determined by forces which, in producing him, built a weak self-system, he is too weak to create a future for himself, a fate of his own choosing. He can glibly blame his past; but he can do nothing about it. The best that we can say of him is that he is capable of simple, spontaneous acts of generosity.

The Saint and the Psychopath

The essential characteristics of the psychopathic personality are thrown into sharp relief when they are placed beside those of the saint. And there are still other "strong" character-organizations that we might consider: for example, those whose ruthless pursuit of power is organized with the calculated efficiency of a military machine, whose mastery over their world is impressive, and who discipline themselves, in this struggle, eliminating impulses to self-indulgence as well as all "sentimentality." Neither self-pity nor sympathy for others can be tolerated; such attitudes would hamper their struggle. They promise themselves to achieve certain objectives and move toward these goals with an undeviating persistence. And in the strength and persistence of their striving, in the toughness and impermeability of their practical views, and in their considered respect for the realities they must master, they are quite different from the psychopath. And there are fearful and dependent self-systems who patiently and consistently work at the task of building defences, crossing bridges in the distant future, and building good-will alliances that will stand them in good stead in time of trial, all in highly organized and self-consistent fashion.

It is the saint, however, who represents most completely the polar opposite of the psychopath. Whether inside or outside the church he works unceasingly to bring about a perfecting of himself and of the world. His hypertrophied conscience whispers unceasingly within, driving him to examine each act from the standpoint of its "rightness" or "wrongness", and the words "duty," "ought," "truth," are often upon his lips or in his thoughts. Commonly he feels himself to be striving to realize God's will, or some infinitely powerful moral law that lies at the heart of the universe; and he seems to draw a kind of strength and nourishment from sources that do not seem available to "the average sensual man." He puzzles us, too, as we attempt to apply our tension-reduction theories to his conduct, for he frequently seems to be moving *into* tension. Instead of "adjusting to the mores" he stands, like Jeremiah, ready to denounce a whole civilization. To be sure, we could speak of him as resolving an intra-psychic tension, of achieving the peace of mind that comes with integrity; but he also *creates* tensions between himself and the group, and risks the rack and the knout. Out of step with his contemporaries, he persists in affirming his convictions, in listening to the *inner* voice, in seeking to stand unashamed before a host of unseen witnesses. If there are tensions within his self-system that he strives to reduce, they are the tensions between his strong super-ego (the ideal self and

its system of values) and those other egoistic impulses that—since he is also human—arise in conflict with the dictates of his conscience. Of all persons, he would be contemptuous of the psychoanalyst's ideal of "full genitality."

Unlike the psychopath, and, indeed, unlike the average sensual man, he looks long and steadily at his acts, evaluating, judging, and becoming keenly aware of the way in which they fall short of the ideal. The period of delay and deliberation, of meditation, before he releases the act is longer than normal. Conscious of his "sins" he strives for perfection, seeking to eradicate every trace of imperfection, taking himself to task, planning a systematic eradication of the tendencies that trouble him, seeking in meditation, fasts, ritual, penance, and good works, to build a self that can be contemplated with serenity.

The saint is the moral perfectionist. The sins over which he wrestles often seem, to the average man, to be peccadillos, matters of no import. The psychopath, of course, totally fails to comprehend him; and, if called upon, he would—in all probability—regard him as of defective intelligence, as weak. We can almost hear him describing the saint as a "sap," a "sucker," a "glutton for punishment." And the practical man of affairs sees the saint as unrealistic, as unduly preoccupied with himself and his salvation, as living for a foolish and Utopian dream. "The world is not a nursery." In psychiatric circles he is apt to be labelled as masochistic, obsessive-compulsive, and his behavior is linked with that of the suicidal depressed patient, with that of the patient suffering from phobias. His fears of moral imperfection are apt to be treated, along with other phobias, as displacements. An analyst would look for the instinctual roots of the obsessive self-doubt, the orthodox Freudian turning to pre-Oedipal conflicts as the sources of that hostility-turned-inward. The super-ego which denies the claims of the flesh reacts to these claims with anxiety, for they symbolize catastrophic dangers: castration, withdrawal of love.

Especially in this matter of sensual appetites the saint and the psychopath represent the polar extremes. The latter scarcely has a brake upon the claims of the id. If the impulse runs into difficulties these are difficulties lying in *other* people. And rationalizations for conduct are never wanting. Indeed, the psychopath is a kind of extreme caricature of the view of human nature which Freud arrived at. With his stress upon the unconscious strivings, upon the irrational and impulse-dominated character of so much of human conduct, and upon the defensive and truth-negating character of that feeble gloss of rationalization which we add "after the fact," Freud has included some of the most characteristic features of the psychopathic personality in his model of the self-system.

But consider the saint, in contrast. He seems bent upon rooting out every taint of egotism and selfishness. The normal sexual desires, the normal appetite for food, the normal delights in physical comforts, the normal laziness—if we use the word normal in the statistical sense—are signals for dieting, prayer, fasting, penance. He fears the claims of the flesh as though they symbolized an evil serpent; and he seeks to eradicate them, harness and control them, lest in his attachment to their pleasure-giving rewards they draw him away from the pursuit of “the good,” and lest *in permitting their reinforcing effects to occur* he introduce into his spiritual economy those conflicts that would forever destroy the integrity, the peace of soul, toward which he strives. His program for the extirpation of these claims of the flesh is planned, relentless. His alarm at the sign of any yielding within him is as great as though he felt an impending and catastrophic collapse of that integrity which is more precious to him than any other satisfaction or reward. “I vow to flee the serpent,” Gandhi wrote in his *Autobiography*. Refusal to take the vow, to diet, to voluntarily extinguish every sexual and sensuous though meant, to him: “The serpent is bound to kill me.” Instead of receiving *reinforcement* from those lapses from his strict moral code, the shock of pain and guilt served to weaken these impulses, sending him back to the confines of the code. What the student of learning would call a “reward” operates in reverse. Sensuous “pleasures” are threatening. They are not rewards at all. (It was in this same fashion that Masserman’s cats—see page 183—crouched, cowered, mewed, when the food-buzzer sounded: it reminded the cats, we imagine, of the associated hissing air-blast.)

There are all grades of “saints.” There are those whose inhibitions of the normal satisfactions in life are used in an aggressive manner to make others suffer, to gain selfish ends. There are those whose concerns with their own soul make them anything but gay companions or dependable fellow workers. There are those whose inhibitions have spread to the point where obsessive doubts and fears have thwarted every spontaneous and creative impulse, who cannot release *any* act (save the defensive or ritual observance) for the simple reason that it is so difficult to fulfill all of the limiting conditions imposed by the super-ego. For example, Gandhi, the extremely conscientious young lawyer, could not collect fees for personal profit, could not undertake cases for personal glory. Instead he had to seek out the penniless ones whose petitions offended the best people. And there are saints whose “fanaticism or theopathic absorption, self-torment, prudery, scrupulosity, gullibility, and morbid inability to meet the world”⁹ offend and disgust us. They seem nearer to the sepulchre and the sanitarium than to those sunnier fields where life can be as it was meant to be: gay, full of robust enjoyment, and full of

unselfconscious zest. "Here the air smells odious with secrecy, with what is not acknowledged; here is woven endlessly the net of the meanest of conspiracies, the conspiracy of those who suffer against those who succeed and are victorious."¹⁰ Nietzsche, a good Kwakiutl at heart, is ready to say, "Let *them* suffer." The healthy mind looks briefly, and passes

But there are also saints who, in their renunciation of all that the average sensual man yearns for, have gained poise, serenity, strength. By every testimony of those who knew him, Gandhi was such a saint. No weakling, he, the force of his personality was felt by all who came in contact with him. Master of himself, he brought the will of others in line with the truth as he saw it. He fasted and risked his own life, not, he thought, to embarrass, bewilder, and confound his enemies, not with hate in his heart, not in search of any ego-limited peace of mind; but with his thoughts centered upon the two central themes of Satyagraha, love and truth, he sought to align himself with the deepest spiritual reality. So he defined his "experiments"

In contrast to the efforts of other, "lower-grade" saints, Gandhi found strength in his renunciation, freedom from preoccupation with the self and its material needs, a power over the minds and hearts of his contemporaries, and a wide area in which he felt the utmost freedom to act. Without the inhibitions of fear, shame, and thoughts of personal loss or degradation, Gandhi was able to move with a sense of personal rightness, with a sense of harmony with forces greater than he. Having developed within himself to a remarkable degree the capacity to set limits, to set goals and to work with singleness of mind toward their attainment, and to employ tactics that are but poorly described as "passive" or "non-aggressive," he possessed a species of moral force, of spiritual grace and freedom of action, that few men have achieved.

His dieting strikes the average man as pathological, as a "self-castrative" act that is logically on a par with that of the schizophrenic patient who uses a razor as an instrument in solving his conflicts over sexuality. His concern about the cow (and other forms of animal life) we can write off as a part of the Hindu faith which scarcely touches us. His absurd medical ideas we can dismiss as the outcome of his lack of scientific training. But we can neither dismiss nor deny the fact that he possessed this moral force.

Who shall be our paradigm, in our probing for the essence of life? The psychopath in whom the super-ego, the conscience and will, have all but flickered out, leaving the field to the strong urge of impulse and the opposing *external* barrier? Shall we choose the one who cannot profit from experience, the one whose "reason" veers like a weathercock with every gust of impulse,

the one who lives—like the animal or the brain-injured patient—in a speciously viewed “here and now”?

Or shall we select the saint, the self-system that has undertaken a kind of Pilgrim's Progress, a conscious struggle with its own imperfections? Shall we see as the distinctly human gift this pain-resistant candor, which can view the self for the miserable being that it is? Shall we see as the uniquely human trait, the capacity to generate power in the self-system through a renunciation that is made for love, for internal rather than external reasons?

Let us grant that the average sensual man lies somewhere between these poles, that—for him—the renunciations of the saint remain a mystery. For him neither complete repression nor complete sublimation is practical or possible. For him, the candor in self-examination is commonly lacking. Nor would he possess the power to do anything drastic about the imperfections he would discover. Yet it is true that these weaknesses are partial, and not absolute. In contrast to the psychopath there is a great deal of this moral force, even in the average sensual man. Neither is the average man wholly indifferent and unresponsive to the power exercised by the saint, any more than he is indifferent to other forms of heroism and sacrifice. Gandhi's life is proof enough that, on many occasions, average men are completely defenseless against such an image of perfection. And if there is any truth in the passage, “And I, if I be lifted up from the earth, will draw all men unto Me,” then there is, in man—even the average sensual man—that which responds to the saint. Examining the saint's way of life William James could conclude: “[It is] the profounder way of handling the gift of existence. Naturalistic optimism is mere syllabub and flattery and sponge cake in comparison.”¹¹

It is interesting to see how Freud faced this question:

“It may be difficult, too, for many of us, to abandon the belief that there is an instinct towards perfection at work in human beings, which has brought them to their present high level of intellectual achievement and ethical sublimation and which may be expected to watch over their development into supermen. I have no faith, however, in the existence of any such internal instinct and I cannot see how this benevolent illusion is to be preserved. The present development of human beings requires, as it seems to me, no different explanation from that of animals. What appears in a minority of human individuals as an untiring impulsion towards further perfection can easily be understood as a result of the instinctual repression upon which is based all that is most precious in human civilization. The repressed instinct never ceases to strive for complete satisfaction, which would consist in the repeti-

tion of a primary experience of satisfaction. No substitutive or reactive formations and no sublimations will suffice to remove the repressed instinct's persisting tension; and it is the difference in amount between the gratificatory pleasure which is demanded and that which is actually achieved that provides the driving factor which will permit of no halting at any established position but, in the poet's words 'ungebandigt immer vorwärts dringt' [Presses ever forward unsubdued] The backward path that leads to complete satisfaction is as a rule obstructed by the resistances which maintain the repressions. So there is no alternative but to advance in the direction in which growth is still free—though with no prospect of bringing the process to a conclusion or of being able to reach the goal.

"The processes involved in the formation of a neurotic phobia, which is nothing else than an attempt at flight from the satisfaction of an instinct, present us with a model of the manner of origin of this suppositious 'instinct towards perfection'—an instinct which cannot possibly be attributed to *every* human being. The *dynamic* conditions for its development are, indeed, universally present; but it is only in rare cases that the *economic* situation appears to favour the production of the phenomenon [that is, the actual quantitative distribution of the forces in dynamic balance]"*

This bit of philosophy strikes a deeply pessimistic note. Although it is abundantly denied in other portions of his writings, Freud here implies that the perfectibility of human nature is an illusion, as much of an illusion as the concept of moral responsibility. In fact, in any thoroughly deterministic view of human conduct man cannot be anything but that which he has to be, the product the "forced" interaction of his "human, all too human" instinctual endowment with that world he never made. And in any psychology that relies heavily upon instinct there is no force that can bind the main-springs of instinctive need save some other instinctual force; and every instinctual demand links man not with the gods, but with the animals. An "instinct for perfectibility," some basic yearning or thirst for righteousness, some need for consistency, clarity, integrity, some need for a sense of oneness with that which man can call good, these he does not find. Yet some of the saint's concerns creep back into the concept of "full genitality" which the analyst offers as a possible and hygienic goal for human development.

As Abraham describes this final stage of development he seems to have in mind a tolerant, wordly-wise adult who neither punishes himself nor others with an obsessive need to throttle the impulses of the id.¹² Such a mature person is neither driven to disavow his basic needs nor, like the psychopath,

* From *Beyond the Pleasure Principle* by Sigmund Freud, pp. 55-57. Copyright 1950, Liveright Publishing Corp.

to express them in untimely and unrestrained fashion. He can be friendly without being too, too sweet. He is the balanced self with a gratified id that is on reasonably good terms with his super-ego (and the mores). The residues of oral, anal, and phallic stages are present neither in the form of a "terrible impulsivity" arising out of prolonged early deprivation, nor in the form of severe reaction formations against the id. He can be just, responsible, and forceful in his dealings with others without being legalistic, punctilious, or overbearing. He can wait, when it is required, or make haste if necessary; the climax of his actions is neither premature nor retarded. He can enjoy the good things of this life, for himself; and he can be generous to others. He is aggressive enough, asserting his rights yet respecting those of others. He is a character who typifies that "golden mean" of Aristotle.

Whatever our conception of the instinctive roots underlying the motivations of the self, it is quite apparent that the organization of impulses that emerges (that totality we call the self) is capable of turning upon any one of these raw materials, of curbing its expression, and in rare instances of so denying and diverting its expression as to make it appear to be wholly sublimated. It is apparent from Freud's analysis of the matter that a complete job of curbing and repressing an instinctual impulse is thought to be both impossible and unwise. Impossible because the instigations continue to arise "down among the cells," and unwise because the unending effort required to build a dyke of "reaction formations" against the tide of instinctive force inevitably absorbs more and more of the forces of the mental apparatus until a warped, suicidal, or disappointed failure results. The saint, he seems to say, aspires to a status that is beyond man's power of attainment. His goals are unnatural. He is therefore inevitably driven either to maintain a façade, to lose insight into his own nature, or to introduce a split within the self-system.

And the analyst frequently implies that the task of self-direction lies beyond ordinary human powers. And it *must* lie beyond them if every act of repression produces a fixated, infantile unconscious at work underneath and determining all our conscious efforts. It must lie beyond them if the roots of the super-ego's power are themselves derived from the id. Like a thermostat so constructed as to cease to call for more heat as soon as the fire is out, the super-ego would wither away and die if it could triumph over the id to the extent of eradicating its force. (In analytic theory, it should be noted, the super-ego's force is borrowed from the id.) And it must lie beyond a self whose illness has warped the self-observing function. The impression gained from a reading of analytic literature is that the effort to perfect the self must be left to others. Only the objective and impartial eye of the physi-

cian, aided by the tool of analysis, can lay bare the structure of the dynamics of the self-system and free the self for productive growth. So helpless are we. Itself determined, our will has to borrow its strength from external non-moral sources. Helpless as we once were, as infants, our conscience was corrupted even as it was formed, and a large fragment of this conscience remains buried beneath that barrier which walls off the unconscious. As Horney puts it: "No matter how frantically our Pygmalion tries to mold himself into a being of splendid dimensions, his drive is doomed to failure."¹³

We can readily imagine, therefore, the attitude that the psychoanalytically oriented physician would take toward the affirmation of Gandhi's followers, who claim that each self contains this power to set limits, to undertake the improvement of its own standards, to discover the truth and to live by it. As one of Gandhi's followers expresses his feeling in the matter:

"Every person possesses a power or strength of mind, which enables him to confine in regulated and restrained channels his pursuit of wordly goods and mental or sensual comforts and pleasures. He does not altogether abjure these but has enough strength of mind to go without them, if in obtaining them he has to transgress the limits set by him. Not until he has somehow persuaded himself to disregard or change that boundary line does his strength of mind fail him. I call this strength of mind a person's moral force.

"This force is independent of his civilization in terms of scientific, economic, or literary progress. It is also independent of his reasoning faculties and philosophical scholarship. The limits may have been prescribed by him or by those who have influenced his life. They may be very low in a first-class statesman, scientist, or literator, and very high in an illiterate or a naked aboriginal. In times of stress like famine, war, pestilence, and extreme poverty, this force may have an ebb. But there is none who has not some sense or understanding of it and its nucleus. Though often associated with religion and philosophy, it has no necessary relation with either. Indeed, there exist religious and philosophical systems which undermine the natural nucleus and teach the disciple to disregard its reaction on his unsophisticated understanding."*

However one would want to modify this credo, its statement sharpens the problem presented by a deterministic psychology, particularly one in which reason is baffled by the extent to which mental life runs underground and the will is tainted at its source by instinctual demands that are not to be denied.

* K. G. Mashruala, in the preface (p. xi) to *Satyagraha, the Power of Truth*, by R. R. Diwakar (Henry Regnery Co., 1948). Used by permission.

REFERENCES

1. Abram Kardiner, *et al*, *The Psychological Frontiers of Society* (Columbia University Press, 1945).
2. Compare, for example, Sherif and Cantril's summary of these arguments in *The Psychology of Ego-Involvements* (John Wiley & Sons, Inc, 1947), pp 472 ff.
3. D J Simons and O. Diethelm, "Electroencephalic Studies of Psychopathic Personalities," *Archives of Neurology and Psychiatry*, 55 (1946), pp. 619-627
- D Hill and D. Watteison, "Electroencephalographic Studies on Psychopathic Personalities," *Journal of Neurology and Psychiatry*, 5 (1942), pp 47-65.
- J. R. Knott and J. S. Gottlieb, "The Electroencephalogram in Psychopathic Personality," *Psychosomatic Medicine*, 5 (1943), pp 139-141
- and Gottlieb, "Electroencephalographic Evaluation of Psychopathic Personality Correlation with Age, Sex, Family History, and Antecedent Illness or Injury," *Archives of Neurology and Psychiatry*, 52 (1944), pp. 515-519.
- J S Gottlieb, J R Knott, and M. C Ashby, "Electroencephalographic Evaluation of Primary Behavior Disorders in Children," *Archives of Neurology and Psychiatry*, 53 (1945), pp 138-143.
- , "Primary Behavior Disorders and Psychopathic Personality I Correlations of the Electroencephalogram with Family History and Antecedent Illness or Injury," *Archives of Neurology and Psychiatry*, 56 (1946), pp 381-400.
- D Silverman, "Clinical and Electroencephalographic Studies on Criminal Psychopaths," *Archives of Neurology and Psychiatry*, 50 (1943), pp 18-33.
- R A Leonardo, "Criminal Psychopaths and the Electroencephalogram," *Medical World*, 65, pp 101-104
- R L Jenkins and B L Pacella, "Electroencephalographic Studies of Delinquent Boys," *American Journal of Orthopsychiatry*, 13 (1943), pp 107-121
4. Lawrence I. O'Kelley, *Introduction to Psychopathology* (Prentice-Hall, Inc, 1949), p. 533
5. Ben Karpman, "Conscience in the Psychopath," *American Journal of Orthopsychiatry*, 18 (1948), pp 455-491
6. Harry Stack Sullivan, *Conceptions of Modern Psychiatry* (William Alanson White Psychiatric Foundation, 1947), p 100
7. Karpman, *op cit*, p 458.
8. John Henry Newman, *Sermons and Discourses* (Longmans, Green & Company, 1949), p 20.
9. William James, *Varieties of Religious Experience* (Longmans, Green & Company, Inc, 1917).
10. Friedrich Nietzsche, *The Genealogy of Morals* (Bonl and Liveright, n.d.), p. 128.
11. James, *op. cit*, p. 364.
12. Karl Abraham, *Selected Papers* (Hogarth Press, 1949).
13. Karen Horney, *Neurosis and Human Growth* (W W. Norton & Company, Inc., 1950), p. 111.

CHAPTER 23

The Theory of Repression and the Divided Self

There is more in the self-system than can be verbalized, communicated, or brought to that level we call attentive awareness. Whether we look at the laboratory studies of learning, problem-solving, recall, or at samples of simple everyday conduct, the evidence is consistent in emphasizing that the field of awareness, the area of communicable happenings, is limited.

The Watsonian View of the Unconscious

The behaviorists, following Watson, were inclined to treat this problem by bringing together two descriptions of the organism's response to its environment. Conscious responses were viewed as *over-all* reactions of the organism in which the highest integrative levels of the nervous system organized all the parts of the effector-system into one response to a field of stimulations. Automatic habits, segmental reflexes, on the contrary, were part-responses which could be shunted through lower levels, operating mechanically under the control of local cues, local circuits of lowered resistance.

And Watson added, conscious responses can be verbalized.¹ Parallel to the child's development of manual and postural skills there is a growth in speech. he points, reaches, grasps, manipulates, *and names*. He rides his tricycle and talks about it. He learns to control his eliminative needs and develops a vocabulary with which to announce these same needs. Watson was inclined, at first, to suggest that this addition to the action-systems of

a verbalizing segment was the basis for the conversion of the behaving organism into a thinker, of the unconscious child who could merely act overtly (demonstrating his powers) into the conscious one who could communicate or think with these speech mechanisms. Thinking, we were told, is merely sub-vocal talking, and Watson thought of this sub-vocal process as a minimal action of the same muscles (larynx, vocal cords, intercostal muscles, diaphragm, lips, tongue, and so on) used in overt speech. At the talking stage the overt, blundering trial and error can become an implicit reasoning (sub-vocal talking about the situation). Overt conflicts can be carried to a resolution *sotto voce*. What the analysts had come to refer to as the outcome of an Oedipus-conflict-motivated repression, Watson was inclined to look upon as the outcome of poor training in verbalization. If the taboos surrounding sexual functions make them a kind of silent area about which the child does not learn to verbalize (and think) properly, he will remain a blunderer, able to act but unable to achieve rational solutions, able to "emote" but unable to achieve conscious insights. Lacking an adequate set of communicable and shared concepts in such "silent areas," his behavior will remain irrational and unconscious. What is the unconscious? It is the un verbalized. A "conspiracy of silence" has produced an area of unconscious behavior.

As he continued to develop this idea Watson modified his conception of verbalizing. There is, after all, nothing magical in the complex of contractions involved in producing the spoken word. The diaphragm, intercostals, and other muscles, which are organized into the rapid succession of syllable strokes, have no peculiar qualities that make them uniquely suited to carry our thoughts. In fact, the deaf-mute who learns a manual sign language comes to do his thinking and communicating with an entirely different group of effectors. And for that matter the writer, with his tools (pen and paper, typewriter) symbolizes his world through a different group of movements; and the draughtsman symbolizes, communicates, and thinks with a group of non-verbal symbols. So does the mimic who, in pantomime, can "say" what words scarcely convey.

When Watson's followers later demonstrated that minimal movements of the fingers occur in measurable amounts when the deaf-mute dreams, or solves problems, it seemed necessary to make the description of the awareness-process more general. When an act or a situation can be symbolized in sub-vocal, sub-manual, or sub-gestural implicit movements, then we are able to think about it, to deal with it *in absentia* or at a distance, and to become aware of it. We can anticipate it and adjust to it in detail or *in toto*; and we can demonstrate and communicate these anticipatory adjustments.

Under this behavioristic view the *un-conscious* is the *not yet conscious*. If it is to be thought of as an *area* it will be thought of as including all those aspects of life where our education has been at fault; and this would include a vast area of visceral-physiological behavior about which all save a sophisticated minority are ignorant. What goes on within our bodies is, for most of us, as mysterious as the other side of the moon. But this area also includes the subtleties of interpersonal relations, which tax the descriptive powers of the most sensitive artist. It would include the pressures from the wider social, economic, and political settings in which we live and move; for these impinge upon us, tense us, and demand a planning and adjustment for which our poor little cognitive maps are pitifully inadequate. We are *in* and *of* the movements of our times; but we either lack the words for them or else we see them with the stereotypes of the press, with that simplified history we learned in the little red schoolhouse, or with the slogans of our class and clique. In the latter case, even though we have a kind of consciousness, there is bound to be a residue compounded of left-over tensions and sheer ignorance, which we can describe as the *un-conscious* area of our living.

So viewed, the unconscious component is a part of every act. It is the press of complex and as yet unorganized instigations (whether from "down among the cells" or from the outer field) which we cannot deal with conceptually—in anticipatory-symbolic fashion. Whether the conscious portion is large or small depends upon the precise history and locus of the segment of behavior examined. Some persons seem sentenced to live out most of their actions in a non-verbal, non-conceptual, non-symbolic, non-thinking, non-aware way. They take life as it comes, acting as they must; and in their intervals of leisure they "jes' res'." Routine minds, or "strong silent men," or flighty and impulsive creatures, or childlike dependents who wait to parrot (unthinkingly)* the words given them by others—all of these may be said to live with a minimum of consciousness. Anxious ones, busily crossing the bridges that lie ahead, are so "sicklied o'er with the pale cast of thought" that action is difficult. They suffer from an excess of consciousness. Since none of us can think, as does the deity, *sub specie aeternitatis*, the unconscious fringe of our actions is large enough, at all times.

Under this scheme of thought the unconscious is no reservoir of instinctual need, continually pressing for expression and warping and distorting the conscious area. It is simply an un verbalized component in behavior, or

* We say "unthinkingly", the moment we mean it we actually reject the Watsonian view. For we imply that there is a labor in thinking and a depth of insight and feeling which no parroting has. It is precisely this distinction that is involved in Cleckley's concept of semantic disorder which he applies to the psychopath. The psychopath parrots plans and ethical judgments. He does not "mean" them.

better an incommunicable and non-symbolic portion. It may be large or small, important or unimportant, weak—in its effects—or strong.* It can become critical. But there is nothing in this view that would lead us to anticipate that all neuroticism arises from unconscious conflicts, from an infantile (primal) repression, from the domain of sexuality. On the other hand conflicts can be painful, exhausting, debilitating, and conscious. Having a word for it does not necessarily ease the pain or solve the conflict. Nor would the view turn the clinician's attention backward to infancy—in the search for the roots of neurosis—except in so far as the notion would prompt him to ask why a normal kind of symbolizing was not developed at this period.

Viewing the self as a learner and forgetter, this conception of unconscious behavior emphasizes the amount of "unfinished business" at any stage of development: incomplete learning, poor discriminations, inadequate conceptualization of the field in which life goes on, inadequate symbolic equipment. It stresses the role of the confused and fuzzy fringe of living not yet reduced to order. The unconscious becomes the mysterious, the uncanny, the bizarre, which cannot be subsumed under the categories we have learned to use. It is the sum of confused anticipatory tensions arising when our cognitive maps fail to provide an adequate symbol of reality. Or it is the "lapsed verbalization" of another day which we cannot now reproduce, but which retains a kind of unity and coherence suitable to that other day. (I do not like you, Dr. Fell; and I cannot name the reason; but when I do recall the occasion that is lurking in the back of my mind I shall be explicit enough. I cannot verbalize it all now, but it is not a vocabulary deficit that blocks me.) Lapsed, or inhibited, the verbal system fails us, now.

Janet's View of the Unconscious

Parallel with, and even prior to, the development of the behavioristic conception of the non-conscious part of our action-systems Pierre Janet had been wrestling with the same problem. The adults whom he saw came much nearer to the Dr. Fell example we have just noted. They suffered from no failure to verbalize, it seemed, but rather from a *splitting* of consciousness. Either through constitutional weakness or through the exhaustion of that integrative force which cements the self-system into one whole, the integrity of the mental life was destroyed and sub-systems operated in independent fashion. Just as the spinal reflexes are freed from the inhibitory control of higher segments, in the decorticate animal, so the hysterical and somnambu-

* There is a colloquialism that runs, "What he don't know won't hurt him," and the better known "Where ignorance is bliss . . .," both of which express this point.

list's "symptoms" were viewed as "running riot" without the brakes of the rest of the system of habits.

For Janet these divisions within the self-system were not along the clefts that separate verbal from non-verbal. True, the subject could not verbalize, recall, describe, that *other* event or system of ideas—any more than in post-hypnotic periods, the subject could report the actions of the trance-state. But the failure was due to some type of functional barrier within the symbolizing function itself. As Janet phrased it, it was due to a lowering of "psychological tension"—that is to a lowering of the quantity of that kind of energy which makes possible integrated and planful action in the real world.

From this distance there is a depressing sort of circularity in Janet's statement of the problem. If we say that the self-system is dissociated into separate sub-systems simply for the lack of that energy which would integrate it into one conscious whole, we have named the problem without solving it. And since the nature of the energy remains obscure (other than as it appears in the effects of its presence or absence), and since no independent measurement or analysis of it seems possible, it is surprising that this conception could be a tool for clinical thinking. Yet in his practical clinical work Janet became skilled in raising or lowering this tension. By rest, by the liquidation of unfinished business, by restriction of the field in which action is lived out, by the carrying through of simple (and then more difficult) actions to the point where the tonic effect of accomplishment could be felt, by the reduction and solution of exhausting conflicts, by suggestion, by moral suasion, he sought to build up this force which integrates the personality. And there is evidence indicating that he succeeded at least as well as those who now operate on a much more complex theoretical base.

Although the unconscious, for Janet, is also the inaccessible, we can see that, unlike the Freudian's unconscious, its content is altogether similar to the content of consciousness. And the materials that are *in* the unconscious have arrived there for a multiplicity of reasons, reasons as varied as over-fatigue (from long hours of work) or exhaustion (arising from a chronic conflict within the family). Nor is the content of the unconscious closely related to the nature of the cause. As in the splitting of a conglomerate rock, the lines of fissure may pass virtually in any direction, the parts may contain almost any combination of substances. It is a matter of the distribution of the forces of cohesion in the sub-systems. But the unconscious does not contain a nightmarish jungle of foetid forces too dark and slimy for the light of day, the shameful parts of life we can scarcely face, and the like. Traumas there are, but the clinically important trauma is the one that exhausts, the

one that lowers psychological tension; and it is located in the present or the recent past, not in a remote infantile past Janet reported cases in which now one side of the self-system was dominant, now the other These dual personalities forced the clinician to make a difficult therapeutic decision. Which was the preferred one? Which was to be made permanent?*

The Psychoanalytic View of the Unconscious

The third approach to this division in the self-system into conscious and unconscious systems, that of Freud, is by far the most complex account. Beside it, the exhaustion concept of Janet and the verbalization concept of Watson, are simple and clear Too simple, Freud thought Indeed, he found them useless for his purposes, and as far from the harsh realities that go on within the mental apparatus as a prettified chromo from the dear, dead past

Freud looked upon the self-system as a battle field, a scene in which contending forces fight to the death He saw love and hate, death wishes and creative impulses, locked in unceasing combat The banishment of a wish to the unconscious was no calm forgetting, no slow attrition of a non-reinforced impulse. Rather, it was a wish-murder comparable to an unmarried mother's killing of her unwanted offspring Moreover, these wishes were so rooted in our very cellular structure, in our inherent makeup, that—hydra-headed—they continued to press for expression no matter how often they were scotched The problem was to trace their origin, to outline the development of the contending systems, to describe the dynamics of the unending battle.

Why there should ever need to be such a war between the instinctual forces is puzzling if the nature of each of these forces is considered singly. Each serves to preserve the organism or the species; and each brings in its train pleasure, relief, satisfaction. For Freud, the notion of a resistance to such impulses, a resistance strong enough to *repress* them (especially in a mental apparatus that is conceived as operating on the pleasure-principle) had to be accounted for by some *pain* accompanying expression And if *all* energy comes from the one reservoir of instinctual force, whence comes that power of resistance which can hold an impulse in check?

One solution was not far to seek; and it is surprising that Freud, trained as a neurologist, has so little to say about it It is in the *arrangement*, the timing, the juxtaposition of impulses that the war is rooted. Sherrington, the neurologist, was pointing to a similar fact in describing the *inhibition* of

* Under this view, it is true, exhaustion tends to lower the level of action Purposeful, planful actions in the real are replaced by the less difficult routine acts, the symbolic or imaginary act—and, at the lowest level, by the mere agitated, confused, anxious, emotional state.

reflexes.² We cannot approach and avoid, flex and extend, inhale and exhale, *at the same time*. Our muscles are grouped around the bony levers with agonists and antagonists neatly opposed, and one or the other must dominate at a time if there is to be smooth and graceful motion, freedom from interference. Moreover, the one must not only dominate but its antagonist must be inhibited, completely relaxed. Even the normal residue of tonus which the healthy, resting, muscle shows, must be cancelled if an optimum grace and efficiency is to be achieved. And he demonstrated that this is, indeed, the case.

Moreover, while a single effector is fed by hundreds of inflowing sensory paths, each one of the sensory instigators cannot have its own way—as it would if there were no other competing stimulus present. In the jostling of the impulses in competition for the *final common path* some must fall by the wayside, or achieve delayed effects, or be shunted into other than their normal channels, canalizing their force into the dominant response which is being realized.

While Sherrington was seeking to show the precise nature of the intricate blocking and shunting mechanism—with its excitatory and inhibitory nerves, its physiological substances that contract or relax the muscular fibers, open or close conduction paths—and while interest was here centered upon the fascinating integration of the parts of the biological machine, Freud was facing the problem at another level of discourse. In spite of his original training as a neurologist, Freud's writings show only the most limited interest in the developments in this field. In the place of neural impulses and excitatory substances he was prone to speak of the *forces* in the id. In the place of synaptic resistance he spoke of the resistance of the ego, of the conscious person. And instead of the inhibition of one action system by another, and the control of a sequence of acts by the pattern of internal and external stimulation in a given setting, he spoke of an *ego* whose function it was to release or repress instinctual forces, to schedule the satisfaction of needs, to survey the field of reality and release appropriate responses.

Thus Freud faced the problem of how the conflict of impulses is resolved with a personalized vocabulary instead of with the more rigorous language of the neurologist. The latter failed him at the very point he felt was crucial. There was, in fact, no good neurology of the ego, no neuromuscular account of the awareness process. And the ego's struggle with its impulses, the banishment of those that were shameful, inappropriate, or too painful to view steadily, was the primary fact. "The essence of repression," Freud wrote, "lies simply in the function of rejecting and keeping something out of consciousness."³

Now before a conscious system can banish an impulse into an unconscious system there has to be a primal differentiation within the mental apparatus. In a sense the unconscious has been with us always (Our biological inheritance endows us, Freud was ready to believe, with a kind of phylogenetic unconscious which we share with others who are or have been members of the human race) And we have seen, earlier (pages 695 to 714), how Freud envisaged the first rise of the puny ego of the infant. Out of pain and frustration he learns of the independent object, the breast, the object whose gratifying powers are independent of his wishes. But with the rise of the ego and the strengthening and reinforcement of *some* impulses on *some* occasions there also arises a barrier, a resistance, a repressive force. And once forces gather beneath this barrier they constitute a "mental constellation" which drags downward even as the ego-system repels the incipient and threatening impulse.

Inhibition Contrasted with Repression

Rooted in a concept of instinctual forces, as it was, Freud's repression differs from the neurophysiological notion of inhibition in one important respect. In neurophysiological inhibition, the inhibited act is "gone with the wind." When we stand up, abruptly, to reach for some object, our "lap" disappears. We do not think of some instinctive lap-forming force which inevitably forces us to return to the seated position. The *next* act arises out of the new context of stimulation produced as the first act is executed. We do not return, in fact, unless the new constellation of physiological states and external stimulation so requires. The instinctual forces that Freud envisaged, on the other hand, were thought of as not so easily displaced. They continue, he thought, to exert an ever-constant pressure toward expression even when they have been banished into the unconscious. Like the adult who once wanted to be a physician but who chose, instead, a career as athlete and coach, never ceasing to regret his choice in spite of successes others viewed as adequate, the self is viewed as plagued by those needs or wishes it denies. Freud's forces in the id are thus viewed as *ultimates*, even when they are banished to the limbo of the unconscious they continue, like poorly disciplined children, to clamor for their objectives. In a sense, therefore, the unconscious arises because repression is *incomplete* and because substitute expressions (displacement, sublimation) are never completely satisfactory. "Repression," he insists, "does not hinder the instinct presentation from continuing to exist in the unconscious and from organizing itself further, putting forth derivatives and instituting connections. Really, repression inter-

feres only with the relation of the instinct presentation to one system of the mind, namely, to consciousness."⁴

Indeed, the repressed idea develops all the more freely in its subterranean cave, for it is now freed from the watchful eye of the ego. Hence to repress an impulse is to put it to work *in* the mind rather than to put it *out* of mind, to eliminate it.

One of Nietzsche's phrases comes to mind. The healthy man, he asserts, has a good digestion; he can assimilate his good deeds and eliminate all others. The sick ones are those who suffer from a psychological sort of intestinal obstruction. They are poisoned by impulses which they can neither express nor expunge. It is this inability to inhibit, eradicate, expunge, eliminate, that Freud seems to universalize; for he postulates a "fixation of the repressed" as an essential attribute of repression (and repression is a necessary phase in all human development). The difference between the sick and the well thus becomes an economical one—a purely quantitative difference in the balance of forces. Ramifying "like a fungus in the dark" the unconscious system of each of us acts like a constant drag upon the ego. And it is thus small wonder if we—like the neurotic—find its indirect expressions terrifying, alien, repulsive. Have not these monstrous products developed in the dark without our supervision?

With this line of analysis Freud could console himself in the early days when the general public rejected psychoanalysis. How could they tolerate the true image of themselves when the true image contained this foetid growth in the dark chambers of the mind? What analysts observe arising from the depths of the unconscious (as they interpret the symbols of dreams) is something the ego has never been able to contemplate; but it existed before the ego, and it continues in spite of the ego.

As this fungus-like growth in the dark recesses of the unconscious continues, and as outgrowths from the repressed impulse ramify to taint more and more of the contents of the mind, there are formed "instinct-saturated" complexes. Some of the peripheral accretions that finally become attached to these complexes are so remote, so dimly symbolic of this primal core of repressed force, that even the informed ego cannot see the connection. Such impulses get past the censor with relative ease, penetrating the barrier without arousing the alarm reaction. It is as though resistance varies inversely with the square of the distance of the symbol from that primary force which was repressed. In freeing the associations of his patient, in concentrating attention upon the distorted symbols of the dream, Freud thought that he was studying such peripheral expressions. Through these channels, by an artful interpretation, he hoped to find roundabout doorways to the walled-off

cores. And he claimed that, by utilizing such doorways and by making the proper interpretations, more and more doorways could be opened, nearer and nearer to the original center of the unconscious clusters. This process of de-repression, of un-fixation, reversed the process of repression and accretion by which the complex and its concentric layers of symbols had been formed.

Conscious and unconscious, the ideal and the shameful, the sacred and the profane, the ego and id, are thus viewed as arising from the splitting and polarizing of one and the same set of forces. Even as the id-impulse is split (half remaining below stairs and half ascending to the brighter conscious level) the two halves become oriented so that they oppose each other. Fixated in this position they remain in conflict for the duration. The more the ideal pulls the more forces of repression have to work against the ideal's opposite number. Thus the ascetic ideal demands, of the devout, poverty, chastity, and obedience. The "holy mother" is de-sexualized, justice is without wrath, democracy is without invidious comparisons, and the deity is constructed without a single jarring note of imperfection. But while we have been creating this galaxy of perfect states we also develop their opposite numbers; and while the devil is made to bear all the vices the fact that we have to wrestle with him so mightily indicates quite clearly that he continues to live within us.

Such a splitting of our forces, dividing as it does the stream of vital energy, locking our energies in a self-neutralizing conflict, begins in the early oral stage, continues through the anal and phallic—indeed, through life. If by the third phase ego and super-ego have begun to take their final form, and the little talker has a sensed boundary to his ego, a definite "I-feeling" to defend and maintain, we need not conclude that the battle of repression is over. Every surge from the id will demand the deployment of counter-forces; and every instance in which the super-ego claims too much will stir the darker forces to revolt. Though the tide of battle seems momentarily to favor one of the contenders, the counterattack can carry the field in the opposite direction. Id-surges and victories can thus be followed by attacks of guilt, contrition, and a super-ego-directed undoing; and excesses of penance are succeeded by a debauch. Failing to achieve a balanced "steady-state" and a corresponding acumen, the harried ego cannot distribute and time the expression of impulses so even-handedly that it can walk the razor's edge between the contending forces of black and red. Instead it seems condemned to waste its energies in chronic and self-defeating conflict, in compensatory corrections *after the fact*.

From his patients Freud learned that an approach to the unconscious is

best made by indirection. A bold frontal attack stirs defensive measures even as the id-surge generates repressive forces. Just as the playful witticism (where no serious attack is intended) allows the hostility of the id an effective outlet, provided its nature remains concealed, just as the game permits us to trounce an opponent *by the rules* (and good sportsmanship forbids taking it personally), so the procedures of analysis are calculated to allay the sensitivity of the wary ego. The patient is urged to speak as though each "revelation" did not count, as though here anything goes, as though what appears on the surface of the mind is prompted by some impish alter ego for which he cannot possibly be held accountable (Indeed, the alter ego is nine-tenths instinctual, a phylogenetic inheritance for which the patient can no more be blamed than he can be held accountable for a vermiform appendix.) Yet the therapist must be cautious in pressing his advantage, or in injecting interpretations before the ego is ready to accept them. Otherwise resistance mounts, the offended ego heaps reproaches upon the analyst's head, and in the see-saw of battle the gains are lost: even that which was communicated is denied, and the therapeutic process which seeks to redistribute the forces in the mental apparatus comes to a full stop.

The Return of the Repressed

Running throughout Freud's theory is the conviction that *repression does not work*. The surging tide from the id may be dammed (and damned!) but its force continues. The *idea* (the conscious representation of the instinct) may be blotted from consciousness; but the peripheral symbols (the remotely associated ideas that have clustered about it and point—however vaguely—in the same direction) gain access to the brightly lighted arena. The *act* may not occur overtly, but indirect and symbolic expressions (or errors and slips of speech and action) betray the continuing force of the impulse. Above all the "affect," the emotional reverberation continues. It may be displaced upon objects other than those at which the id-urge was originally aimed. It may appear to the ego as no emotion at all ("It is my *digestion* that is wrong, not my interpersonal relations. It is my constricted bronchioles, not an anxiety motivated by immaturity and dependence.") In such a case the perturbation in the psyche is perceived by the patient as a disorder of the soma. If we speak of the *conversion* of mental conflicts into physical symptoms this is because: (1) our language lends itself easily to a dualistic interpretation in which mind and body are viewed as independent substances, and (2) it is so much easier for the ego in conflict to view a somatic difficulty than it is for it to contemplate the full-blown image of the

self It is clear that the repressive force acts more successfully upon the idea than upon the underlying impulses and those bodily reverberations we call emotions These latter, we may displace, looking sharply at some *other* source as the cause And we may even fail to recognize the signs as indicators of the presence of emotions Yet as surely as these perturbations continue to exist we must admit that the id is having its way. And to this extent—in spite of the fact that repression has banished the signs of the id force from consciousness—repression has failed.* It has solved nothing, it has put an end to nothing The *return of the repressed* is a constant theme in Freud's analysis He finds it in the dream, the "slip" of speech or action, the witticism, the work of art, the symptom, the projection, the obsessive thought, the phobia In fact it is *the* Freudian theme, repeated with insistence in every analysis of a mental event †

On the basis of such a theory the analyst assumes that the conscious content of the mind, as well as the behavior of the subject, will be full of id-surrogates, substitute formations By examining these contents in the light of this theory, he seems to say, we shall be able to deduce the nature of repression. Or, at any rate, if we can make the cloak of our hypotheses cover the facts, and if, by organizing our efforts in the light of our assumptions and interpretations we arrive at a cure, or if we arrive at a construction of the patient's life that he can accept and live by, then we shall have achieved a kind of validation.‡

* To speak more accurately, the "signs" are not banished for those who are willing to see They are there But they are like ambassadors to a hostile potentate they remain unrecognized; they are not acted upon; they cool their heels in the ante-rooms of the mind, or else—when they are allowed to speak—their every effort to communicate is misinterpreted. There are none so blind as those who will not see

† If there were cases of successful repression, an analyst would not see them If, as James once averred, "that which is not expressed dies" there would be no continuing conflict, no displacements, no distortions, no symptoms, and no need to seek psychiatric aid Since psychoanalysis has not been applied to large numbers of normal persons, any generalization to the effect that repression is *bound to fail* is premature. The serenity of many lives whose patterns of id-expression do not conform to the psychoanalytic ideal of "full genitality" (cf Abraham's discussion of the "genital character") suggest that repression, for some, is not only complete but that it also shifts the biological energies so completely into other channels that strong egos and deeply satisfying lives are built in spite of the fact that many impulses (which we assume to belong to us by virtue of our heritage from our sub-human ancestors) never achieve gratification.

‡ "The mechanism of repression becomes accessible to us only when we deduce it from its results."⁵

It should be added that this is the kind of validation the devout member of a sect—religious or political—achieves He accepts the constructions of his creed, applies them to himself, organizing his life in their terms and achieving whatever measure of success he achieves.

A Case in Point

Thus, at best, this psychoanalytic theory of repression can be *illustrated*. To accomplish this—in his essay on repression—Freud chose an instance which, he says, “has been subjected to a thorough analysis.” It is the case of an animal phobia, similar to that of little Hans, which Freud had reported elsewhere at length. Analysis of the more complete account (the case of little Hans) gives us some understanding of the way in which the pioneer analyst’s mind worked.⁶ This five-year-old boy feared horses to such an extent that he felt safe only when indoors. Outside, in the park, walking with his parents or nurse, he was filled with anxiety. Nightmares interrupted his sleep. In the report of the case it appears that the evidence was collected mainly by the parents, who were already convinced followers of Freud. Interpretations to the parents and to the boy were freely made with little supporting evidence; and in the reported conversations it is apparent that the suggestions of the interpreters and the responses of the boy were so intimately mingled that it is difficult to determine what was spontaneous and what was suggested. Freud comments, perhaps with an unconscious candor, “I learned nothing new from this analysis.”⁷ At one point in his report, when the child—*after* extensive interpretation—produces symptoms and verbalizations which fit these interpretations, Freud assures us “what emerges from the unconscious is to be understood in the light not of what goes before but of what comes after.”* Thus the “data” illustrating the process of repression at work at that very stage when—according to psychoanalytic theory—ego and super-ego are in the process of being formed is a mixture of theory, interpretation, and the patient’s verbalizations, all intertwined layer upon layer with a most complicated network of interactions possible.

To return to Hans. Here, at any rate, was a little boy, who—through whatever cause—developed anxieties and fears. Looking out of the window of the apartment at the “street boys” who were jumping on and off carts, he is content to remain indoors. He is not a “street boy,” his father says. His parents, who were divorced not long after the boy’s analysis, may not have

* A similar emphasis is advanced by Theodore Reik in *Listening with the Third Ear*. It amounts, virtually, to the positing of a critical listener within the unconscious of the patient, a listener to the analyst’s interpretations. When these interpretations violate what this critical listener knows to be true then his immediately succeeding free associations (guided by this unconscious process) tell the analyst in no uncertain terms that his interpretations are quite incorrect. If the analyst retains an open mind and follows the cues given by this unconscious critical listener, we have one situation. If the analyst clings to his interpretation then the patient’s associations must be put down to resistance. This mixture of faith in and distrust of the productions that are interpreted as coming from the unconscious leaves the skeptical reader in confusion.

gotten along too well (There is no indication in the case record that these matters were discussed with the parents. They did not bring their case to Freud * It was the child's phobias which concerned them) The father was frequently absent from the home. The mother is described as anxious and insecure.

When the child's fear is noted by the father—as, for example, when the child is afraid of bathing in a large tub, the conversations reported usually contain so many direct suggestions that the data obtained from the child can in no wise be regarded as a spontaneous sample of the child's thinking.

"I asked him whether he was afraid, and if so of what.

Hans: 'Because of falling in.'

I: 'But why were you never afraid when you had your bath in the little bath?'

Hans: 'Why, I sat in that one. I couldn't lie down in it, it was too small.'

I: 'When you went in a boat at Gmunden weren't you afraid of falling into the water?'

Hans: 'No, because I held on, so I couldn't fall in. It's only in the big bath that I'm afraid of falling in.'

I: 'But Mamma baths you in it Are you afraid of Mummy dropping you in the water?'

Hans: 'I'm afraid of her letting go and my head going in '

I: 'But you know Mummy's fond of you and won't let go of you.'

Hans: 'I only just thought it.'

I: 'Why?'

Hans: 'I don't know at all.'

I: 'Perhaps it was because you'd been naughty and thought she didn't love you any more?'

Hans: 'Yes.'

I: 'When you were watching Mummy giving Hanna her bath, perhaps you wished she would let go of her so that Hanna should fall in?'

Hans: 'Yes.'

Hans's father, we cannot help thinking, had made a very good guess "†

The implicit assumption running through such conversations is that anxiety arises from the repression of guilty and forbidden wishes. And the child is virtually told that:

* The reference to the parents' divorce did not occur in the record of the case of little Hans, as first published. It is mentioned in a postscript in which Freud describes an interview with the youth, many years later. At this later date Hans appears to have forgotten the entire episode, interpretations and all.

† Freud, *Collected Papers*, Vol. III, pp. 209-210. (Hogarth Press, 1949). Used by permission.

It is because you have been naughty and think your mother doesn't love you any more.

It is because you played with your penis

It is because you want to get rid of papa.

It is because you want mamma all to yourself.

It is because you want to get rid of your little sister, and so on.

If the child denies these impulses and if his behavior does not show them (for example, if he cries when his father leaves or shows affection for his sister) this evidence simply shows the extent to which repression has concealed the id's hostilities. Interpretation quickly bridges every gap created by the denials. So we learn that little Hans fears horses and big vans because he has played too much with his widdler, felt incestuous thoughts toward his mother, and now—projecting his hostilities, which arise from frustration, upon his father—feels them return in the animal, which might bite him, displacing his fear of the father upon the horse. Both, Freud reminds us, have big penises.

The case record is so full of arbitrary selections of evidence, arbitrary interpretations, that one marvels that such data could ever even masquerade as the product of "scientific" investigation. The father can build a special railing to keep his infant from falling off the balcony (without having the act interpreted as a defense against the wish to get rid of his child), but when the boy expresses fear for his sister in the bath it becomes obvious that he wishes his sister to drown. As Freud asserts, in one connection:

"... a psychoanalysis is not an impartial scientific investigation, but a therapeutic measure. Its essence is not to prove anything, but merely to alter something. In a psychoanalysis the physician always gives his patient (sometimes to a greater and sometimes to a less extent) the conscious anticipatory images by the help of which he is put in a position to recognize and to grasp the unconscious material. For there are some patients who need more of such assistance and some who need less; but there are none who get through without some of it. Slight disorders may perhaps be brought to an end by a person's unaided efforts, but never a neurosis—a thing which has set itself up against the ego as an element foreign to it. To get the better of such an element another person must be brought in, and in so far as that other person can be of assistance the neurosis will be curable. If it is in the very nature of any neurosis to turn away from the 'other person'—and this seems to be one of the characteristics of the states grouped together under the name of dementia praecox—then for that very reason such a state will

be incurable by any efforts of ours. Admittedly, then, a child, on account of the small development of its intellectual systems, requires especially energetic assistance.”*

Thus the skeptical inquirer is invited to enter a merry-go-round of data and interpretations which move in a predetermined circle. If the patient is fixated upon a repressed set of infantile experiences, the analyst is equally fixated upon a type-outcome to his probing. In a curious way Freud combines a hearty hatred for all that is Victorian, puritan, prudish with a secret acceptance of these same values. He hates those who deny the “naturalness of sex.” Gandhi, preoccupied with his diet, worrying lest milk and nuts strengthen sexual desire, and Freud with his “there is no neurosis where there is a normal sexual life,” seem at the very opposite poles. Yet they are identical in their weighting of the importance of sexuality. Both seem to share a belief in some version of the Garden of Eden myth. Little Hans (like other anxiety-ridden neurotics) has masturbated too much (Neurasthenia, Freud was sure, springs from the residue of tensions caused by masturbation).

The attitude of little Hans might serve as a paradigm for the attitude of many adults in the analytic situation. His father asks, at one point, “Then why *are* you afraid?” And Hans replies: “I don’t know. But the Professor’ll know. D’you think he’ll know?”⁸ There is a word, the patient seems to feel, that will diagnose my fear. Someone surely can give a simple and clear (or if neither simple nor clear, at least a convincing and workable) answer, or solution. Little Hans, like the rest of us, can *feel* the impact of conditions (both external press and internal need), but one seriously wonders whether he is being helped to gain confidence and security by the kind of questioning his parents and the analyst carried on. One questions even more seriously whether his acceptance of the interpretations would provide him with the kind of experiences that would lead to the proper maturing of those skills, those filial attitudes, and the like, that would bring security and freedom.

As a teaching device the conceptually loose psychoanalytic account of repression (and of the voyage of development) can be easily fitted to *any* life history so that the analyzed one can come to a glib verbalization of the causes of his difficulties. If the case of little Hans is a fair example, however, one questions both the closeness of fit of the limited Freudian framework and the practical usefulness of the analysis. One could see how it might easily serve as an escape from (rather than as an instrument in the attack upon) the patient’s moral problems, or the pains of maturing.

* Freud, *Collected Papers*, Vol. III, p. 246 (Hogarth Press, 1949). Used by permission.

In the end, Freud's analysis of the process of repression leaves us in as much of a state of confusion as when he started. It is left as a process illustrating the law that for every action there is an equal and opposite reaction. For every id-surge there is a counter force developed. As the genital libido arises in the phallic period there develops a balancing repressive force. In his *Three Contributions to the Theory of Sex*⁹ he hints that this is a constitutional affair. Elsewhere the emphasis is upon external repressing agents (parents, nurses, the mores, and so on). Hans, who deeply loved his father, wished to kill him. "C'est la guerre," as the Poilu used to say. The emotional life of man is in general made up of pairs of contraries such as these. The mysterious properties of yin and yang in Chinese philosophy were not more obscure than Freud's thinking on repression.

A SUMMARY AND CLASSIFICATION OF TYPES OF REPRESSION.

If we take as our problem the description of those processes and conditions that result in a division of mental life into two areas (the conscious and unconscious) and endeavor to specify precise meanings for each usage of the term, we shall at least be able to see the shape of our problem.

Type I: The Repressed as the Inarticulate and Unformed

What is not yet differentiated, articulate, and capable of being handled under the familiar categories (for example, the novel present, so inchoate and yet so pressing) can be a dynamic affair nonetheless. Multiple tensions fuse into a confused state whose affective toning is mixed. It may be dreadful, weird, uncanny, delicious, exciting, overwhelming. It may contain what is felt as a threat or as a promise of unutterable bliss—or a mere restlessness and vague discontent.

This area contains tensions that motivate us. It drives us to find solutions, it weights our acts as satisfying or indifferent, it contains factors which determine what we shall become. What is today's inchoate tension can become tomorrow's skilled act, understanding, wisdom. In a sense it is an unborn future rather than a repressed past. If anyone asks, "What holds it back?" need we posit a repressing force, or process? What holds back and prevents the full realization, now, of these potentialities that are stirring within us? Why don't we all promptly mature to our full stature and see, now, what tomorrow's hindsight will reveal? It becomes apparent that our questions raise all the problems of growth, learning, perceiving, reasoning.

Every factor that the theory of human behavior has painstakingly segregated and experimentally tested is a possible "repressive" agency. In contrast to such a multidimensional and multifactorial analysis, psychoanalytic theory monotonously returns to the Oedipal and pre-Oedipal paradigms.

Type II: The Repressor as an Inhibiting "Regnancy"

The self-system is not a unity. We are, at best, poorly integrated, our reflexes, needs, and habit-systems, are loosely bound. From day to day the cross-currents of pressures to which we are subjected, the conflicting invitations to goals that would lead us down disparate paths, stir the different potentialities within us and throw now this, now that set of coping mechanisms to the surface. The face of reality changes, even as the pattern of needs and expectancies shifts; and since we cannot approach, avoid, love, hate, dominate, submit, swallow and spew out, all at once, some parts of the pattern must take precedence while others are held in abeyance or denied expression altogether. As James was inclined to put the problem: since we cannot be a bon-vivant, philosopher, poet, lady-killer, man-of-affairs, recluse, power-seeker, martyr, at one and the same time, now one, now another system has to rule. And as the consequences of our choices work their effects upon our maturing action-systems, supporting and strengthening here and inhibiting there, bringing to the foreground fresh options, a limited set of roles is organized into a regnancy. This regnancy consists in a recurrent set of expectancies and coping-mechanisms, a dominant cognitive map, a prevailing set of tensions.

Instead of a hesitant, to-and-fro, yes-and-no, want-and-fear, type of state (such as that into which Masserman threw his cats by his externally ordered incentives to approach and avoidance) the organism is able, normally, to do two things:

First. To choose one alternative, and in acting to inhibit, displace, set aside the opposite. In walking, eating, looking, swallowing, breathing, our sensori-motor systems are equipped so that as agonists go into action the antagonists are thrown out of gear. The skilled movements of the virtuoso represent such a complete freedom from hesitation or interference in the most highly developed form. In the novice (or in one who is confused and emotionally tense) movements show a great deal of mutual interference; and rigidities and tensions in posture and movement result as agonists and antagonists pull against each other. In this latter case grace and precision are lacking and fatigue and muscular cramps rapidly ensue. The postural cramp of "piano arm" or "writer's cramp" are examples of this failure to

achieve proper inhibition, timing, and clearance of contractions. Even the smooth muscles (pupil, blood vessels, intestinal walls) possess this kind of shunting mechanism.

There are limits to our powers of pacing and coordinating responses. At high speed the speech mechanism "stutters," the rhythm of the dance-step breaks down, the bowing of the violinist grows tense. And where action must be aimed at carefully discriminated targets the limits of our powers of perception mark a boundary beyond which faulty generalizations produce a confused mixture of approach-avoidance.

As the limits of our inhibitory powers are surpassed there supervenes a poor timing and coordination of impulses that is exhausting, fatiguing, energy-wasting. The neurasthenic's exhaustion, which psychoanalysis would blame upon repression, is here seen as due to incomplete repression, inadequate inhibition. The chronic fatigue, the feeling of weakness, the sense of personal inadequacy, the paralysis of will is here looked upon as the end-state arising out of a chronic failure to bring order into a system of acts, to develop a regnancy that will both express and repress, facilitate and inhibit.

Second. To postpone the displaced impulse, and—where it represents a genuine, persistent, and deeply felt need—find appropriate time and place for its expression with a minimum of conflict. The map of reality we carry as a pattern of expectancies, the "dream" of the future, the "ego-ideal," can help us to tolerate the tensions of the unfulfilled impulses . . . up to a point.

If we speak of the ego as the force or agency that does this postponing, distributing and timing, it should nonetheless be apparent to all that we are using a shorthand expression for a process that has many determinants.

And if we speak of the ego as weak, as failing to integrate, as failing to express some impulses while at the same time failing to completely inhibit others, it should be apparent that, once more, we are using a figure of speech.

None-the-less it seems legitimate to speak (as Murray and Kluckhohn do)* of a *regnancy* if we mean by it that dominant and recurrent system of actions through which the main canalization of our needs occurs, that expressed system of actions whose steady strength replaces or displaces or postpones contrary "possibilities."

Such a regnancy, like the old woman who lived in a shoe, may face such a confusing clamor of needs that no organized plan of expression emerges to steadily reduce the tension of the unfulfilled. It can be exhausted, and the chaos that follows is like the breakdown of the virtuoso's style when over-

* Murray and Kluckhohn write, ". . . one function of regnant processes is the periodic appeasement of different needs." And again, the authors refer to the personality as constructing "schedules which permit the execution of as many conations as possible, one after the other." ¹⁰

work and tension produce muscular cramps (persistent simultaneous contractions of antagonistic muscles). The spoonerisms and cluttered speech of the extremely fatigued person illustrate a similar breakdown in the organization of movements

The regnancy can also fail because of the narrowness and insufficiency of the organization; for in this case it leaves too many needs chronically clamoring for expression. Or it can fail for want of those tonic and supporting satisfactions, the sympathetic and appreciative human responses that give the ego its significance, its force. It can fail for want of a foreseeable possible future (as when the dependent ego loses its human support in the death of a loved one, or when the harassed problem solver is confronted by insoluble situations).

Type III: Repression as an Anxiety-Induced Loss of Awareness

The automatic character of repression illustrated by a case of petit mal
A study of a case of "petit mal" presented by Dr Wayne Barker provides a dramatic illustration of a third conception of the repressive function that has gained acceptance in psychoanalytic thinking.¹¹ This conception could be roughly conveyed by the analogy of an electrical circuit in which a circuit-breaker or fuse is placed so that a delicate conduction network is protected from surges in the flow of current. Such a device can be arranged so that when the flow passes a certain optimum volume the circuit supplying the delicate conduction network is broken and the flow directed into channels that can carry the current without damage. And the apparatus can be further arranged so that when the flow falls to the point where the delicate network can tolerate it, the current is again shunted into its former path.

If we let the delicate network represent the highest levels of our sensorimotor system carrying those total integrations with our environment that we call conscious, and if we let the shunting into other channels represent the innervation of the motor and glandular reactions that discharge the surges of neural energy without any accompanying awareness of their origin, we have a rough analogy for this third view of repression. The non-conscious expression would typify many of the symptoms of neurosis which so often appear to be without cause, or which are treated as "purely physiological" in nature (for example, tic, spasm of the esophagus).

This view is frequently stated in terms of a pleasure-pain theory. Thus the conscious network is thought of as capable of bearing only a limited amount of anxious stress. When this limit is surpassed a fainting fit, a "blackout," supervenes, and nature mercifully protects us from what we

cannot endure. Pleasure is equated with those steady-states in which there is a minimal flow through the network, and pain, rage, anxiety, and all the unpleasant variants are equated with high levels of excitation. The pleasure-pain theory of conduct then goes on to state: "There exists in the mind a strong 'tendency toward keeping the quantity of excitation low.'"¹² And the pleasure-pain theory of repression would add: There is a protective barrier which shunts excessive excitation threatening the conscious system into unconscious channels.

In psychoanalytic theory the chief source of these threatening surges in the power line is the id. Goaded by some frustrating situation the id pours forth hostility in dangerous amounts, and the danger is intensified further by the anticipation of the consequences that would follow the expression of hostility. To the extent that the individual is helpless and dependent upon those who frustrate him this amounts to a double frustration: even the expression of anger becomes dangerous, here, and the individual must either experience a cycle of mounting tension or, as the tolerance point is passed, the energy will have to be shunted into less noxious channels. Either awareness must be altered, expression displaced, or a protective non-consciousness develops.

Or, to take another typical cycle, the id may make sexual claims where these are tabooed. It may claim a degree of interest, concern, affection, indulgence, it is unable to win. The pain of these unrequited claims, the angry hurt, the frustration, again require a redistribution of impulses, an alteration of the awareness of the "object," a protective blotting out of the ego's pain, a drawing off of the impulses into some relatively innocuous expression.

To this conception there is frequently added the notion of an "unconscious vigilance." It is almost as though there stood at the portals of consciousness a watchful chamberlain of the mind. His business is to scent trouble before it occurs, to recognize impossible and unreasonable claimants before they have an opportunity to press their suit. Thus Freud speaks of portions of the super-ego that are unconscious, and in close contact with the id, as operating to censor the id-impulses before they reach the stage of being conscious. In their stead there appears only a vague disquiet, a super-ego-based anxiety, which is typically displaced upon some object that can be more easily "handled." It is as though some sub-committee of the ego, posted in an antechamber, passed upon every claimant before granting him admission, shunting undesirables to the sub-cellars of the mind. In very special cases where the efforts of this committee fail to dissuade the one pressing for admission, they can, as a last recourse, throw the switch that plunges the entire inner court (of ego-consciousness) into complete dark-

ness. Or, in a less animistic figure, the automatic circuit-breaker could do the work.

Barker's case of "petit mal" may be viewed as an illustration of this last eventuality. A young wife, 23 years of age, suffered from petit mal attacks in which brief blackouts, lasting from 10 to 30 seconds had occurred with frequencies varying from 5 to 30 times daily. These attacks had begun when she was 10 years of age and had recurred with brief free intervals until the present. They rarely involved loss of control of the sphincters, nausea, weeping, convulsions. During the eight months following her marriage she had experienced attacks of gradually increasing frequency and severity in spite of medication and dietary restrictions undertaken to control them.

It is common to regard such epileptic attacks as of spontaneous origin, as due to physico-chemical changes in the cells of the central nervous system, and as an expression of an inherited constitution. Electroencephalic records show a characteristic "spike and dome" wave that is of high amplitude and low frequency (three per second).

Operating upon the assumption that the attacks represented an adaptive form of behavior, Barker sought to establish a specific relationship between them and the situations that immediately preceded their onset. To this end he encouraged the patient to keep a diary record of each attack and of the immediately preceding thoughts and actions, viewing the latter as the precipitating causes of the "blackouts." The automatic repression had operated with such efficiency, however, that the records threw little light upon the causation of the attacks.

Direct questioning did not improve matters, nor was there anything suggestive in the case history, save possibly the large gaps created by areas of amnesia where normally accessible childhood memories were screened from recall. It was not until a less direct form of probing, a modification of the free association method which Freud first applied to the analysis of dreams, was used that significant material began to appear—material relating to intense interpersonal conflicts within the family.

When the analytic techniques had been applied over approximately two months the pre-fit categories of behavior had changed. The amnesic gaps had been filled in with data that sharply contradicted the bland story she had first given to her physician. Under the influence of the therapy, which furnished support and interpreted her blackouts, her tolerance for and her ability to express hostile urges increased. In the place of seeking escape in the blackout of the attack, she now felt impelled to do something about the situations confronting her. to attack, to liquidate, to modify them through socially acceptable types of expression. As a result the grand mal seizures

disappeared and the frequency of petit mal attacks declined. She found that new satisfactions in living could be sought and won.

Barker's case is a special instance in the general area of repressive phenomena. Its special advantage lies in the fact that the unusual organic susceptibility of the epileptic served as an indicator to mark the moment at which stress passed the tolerant point.

Barker's data suggest that *any* sudden access of emotion, *any* excitement (whether pleasant or unpleasant) may carry the epileptic past that tolerance point below which life can remain symptom-free. Janet has described a patient who had been kept symptom-free solely by cutting down all excitations and excessive tensions. Feeling that the patient's cure was depriving him of normal interests a friend had encouraged the patient to become interested in aviation. Taken to the airport the patient approached a plane about to take off. With the first sputter of the engine the patient experienced a seizure. It was as though the slight increase in stimulation filled to overflowing the reservoir of tension. The "fit" then served as a mechanism of discharge.

The data on Barker's case are incomplete in one respect. they give no insight into why, after therapy, the patient is able to tolerate the kind of painful awareness that shortly before had led to the attack and the blackout. Somehow, through the therapy, she has come to tolerate an image of herself that had hitherto put consciousness to rout, as though the anticipated fear-some image entailed some catastrophic event. And once having learned the trick, her symptoms remain in abeyance while she is busily occupied in "working through," "undoing," putting to rights a more realistic picture of herself that she can now tolerate.

That her attacks brought a loss of consciousness is a simple fact. That her attacks occurred in order to achieve such a loss of consciousness is an interpretation. Some of the data do not fit this interpretation. That, in the setting of this immature and inadequate ego the attacks may have provided a "way out," a status of invalidism which made it unnecessary for her to undergo the struggle of maturing or the pain of confronting the reality that was her life pattern, may be true. That the method of treatment provided her with a reconstruction of her own experience and a new mode of conceiving her present and future is probable. Whether the method also resulted in a genuine maturing of the personality and whether the views of her family, her husband, were of a type that permitted her to deal effectively with them, we do not know.

Looking at the case as a special instance of the task that confronts us all, we could say: "Here is a young woman who has difficulty in looking steadily

at herself or at her life-situation. She developed an account of a tranquil childhood and achieved an *un*-awareness of countless threatening and frustrating circumstances in her present life. When pressures mounted and adjustment became difficult she lacked the force and the knowledge of ways and means wherewith to attack, modify, and liquidate these life-situations. She became increasingly adept at scenting danger, reacting with her adaptive non-awareness before the stressful event reached full consciousness."

Most of us stabilize our lives at some point where the automatic repression process leaves us with a working grasp of reality, with a limited area of freedom wherein promises can be made and kept, and with a sufficient tolerance for the awareness of our shortcomings to make possible some profiting from experience. If the psychopath is akin to the epileptic, as many clinicians aver, it may be that the resemblance lies at this point: the tolerance point is low. Instead of experiencing blackouts or discharging stress in petit mal seizures the psychopath shunts the surges from the id into overt acts which disregard both the standards of the culture and the long-term requirements of reality.

Two facts in the Barker case are worth special emphasis as at least partial validation of the theoretical analysis. Probing at the sensitive points which a free association method had revealed often induced a series of repeated attacks (with typical spike and dome EEG's). And the new ways of coping with stress, which were achieved in the course of therapy, did result in some alleviation of symptoms.

THE SELF-SYSTEM AND ITS AWARENESS OF ITSELF

We become, as we develop, a person with a role, with responsibilities and powers, a person with a future and a past, a person with a dream, a plan, an ideal. We also become confused and somewhat battered, defeated. We may even become so disorganized, so trapped, so threatened, that we lose the sense of the future which would otherwise support us. Theregnancy has virtually abdicated.

In egos that are strong, where actions are decisive, repressions and postponements complete and well-timed, and where all the needs whose satisfaction should be guaranteed are respected, life is played out like a skilled movement, with grace and charm and power. Here repression is as complete as it should be. Postponements are as long as they need to be. Expression is as full as it deserves to be.

Such a state—an ideal one, be it confessed—seems to be that state of a high level of psychological tension of which Janet so often spoke. It is the negative of neurosis

The integrity of such a self-system as this strong, non-neurotic one, is an outcome of a whole history, a constitution, and of an organic endowment shaped by thousands of experiences in a very concrete and particular matrix. No single item or narrow constellation of events can predict the whole. Nor will it do anything but confuse and hamper our thinking to try to project this complicated totality upon some ultra-simple schema—be it the Garden of Eden story or the story of Oedipus Tyrannus. Formulas of this type serve to convey the “feel” of the problem, but they exclude too much.

Nor can the strength of a particular ego be understood in terms of any generalized human nature, of an instinctive endowment, or of a typical life history. For one thing, the culture and the sub-culture are there, the particular constellation of personalities that constitute the family, the boys and girls of the neighborhood gang, the vocational opportunities, the heroes and myths, the significant persons (and historical movements) to identify with.

Nor is the ego some primal force that brings order out of whatever chaos exists. The ego is itself an outcome. And if the culture contains (as what culture does not?) the seeds of its own destruction, if its values are very much in conflict—if it praises “dominance,” status, and power on six days of the week and then, on the seventh, bows its head while its pastors intone “blessed are the meek”—then the strength and integrity of the ego are weakened. As with Pavlov’s dogs, rewarded for selecting the ellipse and punished for selecting a circle, the conflict can be so strongly motivated, the discriminations so fine, that the conflicting values of our culture produce a wholesale neurosis. Reading the newspaper editorials written during a war period of the past makes an observer wonder if we are not subject—at such times—to a mass neurosis. And the same Sunday supplement that brings us the Horatio Alger story of some poor boy who made good tells us also of an Albert Schweitzer who unselfishly devoted his life to a group of natives who could share very few of his values. We learn, as schoolboys, certain meanings for the slogan “Liberté, Egalité, Fraternité,” yet in the same public projects that make us thrill to see what democracy can do (for example, Norris Dam) we read the slogan over the drinking fountain: “For whites only.” Our religious heritage we draw from Judaism and we worship, as sacred, a Jew, crucified, while we discriminate against our Jewish contemporaries in a wholly unchristian fashion. We give homage to aggressive pride and strength, doffing our hats to men of status, and yet profess to be-

lieve that the meek are blessed. Hercules and Christ, commissar and yogi, vie with one another as "heroes" before the youth of the Western World. Is it odd that children who develop in such a society are sometimes confused, unable to develop regnancies strong enough and broad enough to canalize all need-tensions effectively?

To speak of the hysterical constitution, therefore, *before* the succession of conflict resolutions has been lived through, before the contexts through which a life is to move are known, is to re-ify an outcome and to place it in the beginning as hypothetical cause. Hysterical constitutions (that is, prone to break) there may be; but it will be in the animal laboratory that such constitutions can be isolated. To speak of such a constitution—in the human instance—is usually to hypothecate an explanation that fills the gaps in data of a life history that are commonly too sketchily known.

Nor may we select, in advance, precisely the point where *this* individual will break down (unless we are soothsayers) or say in advance what *the* basic conflict underlying the neurosis is bound to be. It can be a conflict over money, the position of women, status, sex, politics, control of children, love, and so on. Nor may we select any *point* in the course of development as critical (for later history) or as *the* point at which neuroses occur.

Nor may we decide—in advance—the content of that which is excluded or included in the regnancy. A gangster's ideals repress sympathy, softness, or any giving the sucker a break. A boy's super-ego rejects every touch of the feminine. A power-seeker's goals do not permit him to find peace at any submissive way-station. A "practical" family will exert every pressure at their command to prevent the "sacrifice" of their child in: a love match, a life devoted to social service, too great an interest in the underdog, risk of ostracism in any "fight for justice," sacrifice of life in patriotic defense of homeland, and the like.

What will be repressed (and how thoroughly) can only be seen and understood as it occurs in the light of a total history in a context.

The moralist may be certain, as Gandhi seemed to be, that it is the instinctual that is sinful, that must be repressed; and he will feel that it is some weakness in the character, some lack of moral force, some primal fall that is to blame when he runs into difficulties. Neurosis instead of death becomes the wage of sinful living. And this ancient Hebraic notion is not too far removed from the psychoanalytic formulation (although there are certain aspects of psychoanalysis that make it seem like a Hebraism upside down).

The fact seems to be that in resolving our conflicts the "potentialities for good" are as often repressed as the "potentialities for evil." The conforming

pattern may dominate, or non-conformist rebellion; the instinctual makeup, or the cultural artifact; the "vital force" which seeks power, mastery, pleasure, or the "moral force" which struggles to live by the ideals of love and truth. In either case, if neurosis and conflict persist—because the ego-system is not wholly successful, because the timing is poor and the inappropriate impulse appears where it should not, or if that which cannot be wholly repressed, if life is to go on, continually returns to interfere with the regnancy—the return of the repressed cannot be prejudged as a return of some stock type of impulse. libido, destrudo, anal-sadistic, masochistic, Oedipus fixation, and so on. The repressed is as much an historical outcome as the ego, as likely to be a culturally determined artefact as an "instinctual" force, as likely to be some "good" as an evil. Goodness can destroy an evil man's integrity even as evil destroys the integrity of a good one.

Type IV: Repression as a Phase of Self-Consciousness

There is something rather impersonal in this notion of a regnancy which, like any other neuromuscular pattern, must inhibit antagonistic contractions. The self doesn't feel like that! Others, viewing the operation of the self-system in detached fashion, from without, may be content with this objective account. Not so, the self itself.

The ego is more like a country at war, busily constructing a gloss on its activities while it is shelling the enemy and burning and pillaging the countryside. And the defensive gloss is an essential part of waging war. It releases the inhibitions of the soldier who has drunk too deeply of the waters of tolerance and humane-ness. It strengthens the home front, justifying the rationing and taxation which limit the expression of other needs. It bolsters relations with all those other nations who are somewhat inclined to express their own anxiety (created by our show of aggressive force) by a sympathy for the under-dog.

In justifying what we do we must, perforce, convert our enemies into something less than human, distorting them into animals, criminals, perverts, insane ones who lie beyond the boundary within which the tides of our sympathy flow. Thus the perceptions of the outer world are changed even as we wage war upon it and defend ourselves. Even as we fight we are not content to let it go at that. Cynical leaders may be content to concern themselves mainly with logistics and strategy, aware that battles are won by those who get there first with the most. These are the so-called "realists" who look upon the fight with matter-of-fact vision, viewing it as a problem in engineering.

For all their realism, however, they reckon without full consideration of

the nature of man (or of the human predicament) Man has been bitten by the Hound of Heaven and he suffers from a phobia as the result. As though he had once caught a glimpse of goodness, or of the self he might be, he remains forever discontented with the image of the self as it is Worse, he may be horrified by it Man cannot contemplate or accept the image of the self as it is The mirror of Narcissus is never so distorted as when it flatters. Rational man behaves like one who "knows better," who has a feeling for the kind of relations that should obtain among men, who has known sympathy, compassion, tolerance, understanding, humaneness—enough, at least, to develop a "thirst for righteousness," enough to develop a standard by which to evaluate his own acts

Yet for all his vision and for all the fever that rages as a result of his inoculation with the virus of the ideal, his nature is not suddenly and completely transformed thereby. Like the mountain boy who has gone to the city, and who has neither learned city ways nor ceased to yearn for the freedom and good companionship of the hills, man's "old" needs and appetites continue to press for satisfaction, to struggle against the restrictions of reality (both human and impersonal) and to use inappropriate coping mechanisms He acts, in short, somewhat as he did before his vision, as a "natural man," as one who is unenlightened He is not compatible with the dream. He is not of one piece

At this point a conflict within the self-system begins. *They* are to blame. (I could be . . . if . . .) I am not *really* so criminal (bestial, selfish, foolish) I kill only that which is evil I rob only those who have stolen from me. I make war in the interests of peace. I overthrow governments in order to liberate the masses *They* are much worse than I

If man could contemplate both the vision and his own image, if he could keep a discriminating eye upon reality while enduring the pain of realizing his own nature, striving patiently to alter the tensions within the self-system, living for the dream but not as a dreamer, then he might move in the direction of greater integrity

But this *if* is a large one; for man's tolerance of these tensions is limited, his grasp upon reality is not too strong It is not that he intends it this way, or that he is conscious of a willful distortion It happens that way Repression, displacement, projection, rationalization, and the construction of fictions about the self and about the world, seem to be automatic processes; and they become habitual The evidence suggests that the really BIG LIES about the self are those of which the self is unaware. The most serious barriers to spiritual progress are those concerning whose existence we are blissfully unaware, whose existence we fight to deny. Thus, if we describe

the ego's struggle to maintain itself as like those of a nation at war which must justify its ways to its citizens and to others, we ought to add that—purposive though the self's distortions may be, and calculated to reduce tension, to provide a pleasant (at least relatively pleasant) gloss on behavior—the self is no witting participant in this struggle.

There is a hardness, a toughness, in the self-system which everyone who works with other selves must feel—a resistance to insight. We can almost sense the embattled ego—like a crafty spider at the vortex of a web of relations, spinning its defensive barrier, laying its trap for the unwary, constructing a web of illusion through which to view the world. All to the end that the ego may be protected while enjoying and releasing the needs that arise. That the methods it employs are not always wise, or congruent with reality, that it compounds its errors with additional defensive hypotheses, that its rationality is limited (and hence its capacity to learn) makes it an unpromising subject for retraining (and, especially, for self-training). Caught in the web of its own spinning, the spider-ego repels all invaders. In vicious cycles of action it returns to the same vortex, again and again. It reduces all facts to their web-surrogates; and what cannot be projected upon the web is as though it were not—as far as awareness is concerned—save in so far as the effects of repression continue to exist in a distorted awareness. The web and the ego are counterparts of one another. We, the others, occupy positions on this ego's web (even as we place him upon ours). Even those he loves most deeply are there, and their image-surrogates are not always good replicas of the forms that would be seen by the unwavering eye of a recording angel.

In fact, one suspects that where the tensions in the self-system are very great, where ego-ideal and actions are far apart, where conflict is great and needs are strong, then the "loved ones," the significant persons suffer most of all. They are idealized beyond recognition, or they are asked to do the impossible, or they are accused of the unmentionable. The neurotic ego within the family circle is thus a very "costly" person. If the family preserve his illusions they will have to dissemble; if they gratify his needs they will have to surrender their own legitimate claims, or if they speak the truth as they see it they will become a most serious threat; or if they embark upon coöperative tasks (particularly of an interpersonal nature) they will be forced to live in two worlds which are difficult to harmonize (that is, to keep in mind a running double-entry account of what goes on). The neurotic within the family circle rewards his relatives with ingratitude, blame, hostility. If he outlives the others he gives them an immortality (by preserving image-surrogates of these others in his memory-system) that they would

scarcely choose, an immortality far removed from the reality that it seems to keep alive.

It was the struggle of the ego to defend itself that Freud's insight laid bare, a struggle that the ego could feel yet fail to see objectively. It was the intimate connection between needs, perceptions, and self-consciousness that made a psychoanalytic approach to the neuroses a dynamic one in contrast to the more static physiological or constitutional theories. Yet in the effort to warp the voyage of development to the narrow frame of a hypothetical sexual history, the psychoanalytic view develops its own static qualities.

At its best the problem of self-consciousness involves us in such a web of subjectivity that we almost doubt the possibility of a "scientific" solution. And if the capacity to see life steadily and to see it whole is made difficult by the struggle of an embattled ego to realize its needs, the solution may have to wait until the student of these problems has himself acquired a stronger, more secure ego.

REFERENCES

1. Ethel Dummer (ed.), *The Unconscious, a Symposium* (F. S. Crofts & Co., 1928)
2. C. S. Sherrington, *The Integrative Action of the Nervous System* (Yale University Press, 1906)
3. Freud, "Repression," *Collected Papers*, Vol. IV, p. 86 (Hogarth Press, 1949).
4. *Ibid*, p. 87.
5. *Ibid*, p. 92.
6. The case of Hans is found in Vol. III of the *Collected Papers*. The other illustration occurs in Vol. IV, p. 93 ff.
7. Vol. IV, p. 287.
8. *Ibid*, p. 191.
9. Freud, *Three Contributions to the Theory of Sex*, Nervous and Mental Disease Monograph, No. 7, 1930.
10. Clyde Kluckhohn and Henry A. Murray, *Personality. In Nature, Society, and Culture* (Alfred A. Knopf, Inc., 1949), p. 15, p. 18.
11. Wayne Barker, "Studies on Epilepsy: The Petit Mal Attack as a Response within the Central Nervous System to Distress in Organism-Environment Integration," *Psychosomatic Medicine*, 10 (1948), pp. 73-94.
12. Freud, *Beyond the Pleasure Principle* (Liveright Publishing Corporation, 1950), p. 4.

CHAPTER 24

The Normal Personality

Here at the end of our gathering together of the studies of human behavior *as it is*, we are ready to face the question, "So what?" In a very real sense this question carries us beyond psychology. Psychology itself is a set of methods, facts, principles concerned with human behavior as we find it: good, bad, intelligent, stupid, saintly, psychopathic, healthy, insane. It is not an authoritarian gospel which directs us to become a certain type of individual.

In general, the psychologist is content to lay bare the facts, to show what-follows-what, to show the regularities in behavior, to lay bare the conditions responsible. Its laws are not moral laws but conditional statements: if A, then B.

Yet psychology is in a peculiar position. It can scarcely claim an ivory-tower position, urging that the study of human behavior is an enterprise to be valued for its own sake. It touches too frequently on sacred matters, on values, to claim such neutrality. Willingly or no it has been drawn into clinics, plunged into the moral responsibilities of counseling, guidance, psychotherapy. Whether rightly or wrongly, the public has concluded that there is significance in the psychologist's findings. He is even asked to assist in deciding the question, "Is this behavior *normal*?"

As psychology has developed over the past 50 years it has grown so bold as to undertake the assessment of whole individuals, the description of the personality as a whole. In this latter task the psychologist who has been trained in experimental and statistical methods is placed in a difficult position. For one thing, he is called upon to function as an artist, to make a synthetic judgment, to preserve the proper balance and proportion, to highlight the essential details—in short, to utilize and reveal *his* values. The training

of this psychologist has been carried out, however, under the cult of objectivity; and he has been characteristically interested in *process* rather than *person*. And he is interested in *how*, precisely, a process goes on, not in how it *ought* to go on. He is interested, for example, in the learning process, or in concept-formation: not in the learner as a person, not in the life style of the reasoner nor in what the reasoner *ought* to discover, least of all in what the reasoner ought to be. He collects statistics of failures as well as successes, computes the critical ratio of the differences in the measured performance of two populations studied under controlled conditions. Who his subjects are, what kinds of selves are involved, he seldom asks save as their history touches upon the conditions with which his study is concerned.

Yet when this psychologist becomes a clinician, he is suddenly faced with a much more complex task, that of assessing a life-as-a-whole, of estimating assets-and-liabilities-in-relation. And a great many of his functions depend upon his own personality, his life style, his own way of reacting-as-a-whole. In the last analysis, *he* is the measurer, the one who grasps the essence of a patient's nature. Although he has a few measuring instruments, and a few routines like those of the chemist or physicist who searches for an unknown, there is no electronic calculator into which he can put all his data in order to discover an index number for a person.

The differences in tasks, training, and techniques, have made for many unkind and disparaging remarks, passed in both directions from the laboratory to the clinic, and from the clinician to his experimental brother. From the laboratory comes the charge: "You call yourselves scientific therapists, you of the clinic; yet you neither test your hypotheses experimentally nor publish a standard deviation. And you *receive* the products of an uncontrolled course of development, you do not produce them or control the conditions. Indeed, you seldom publish adequate statistical analyses of the conditions *recorded*." From the clinic comes this retort: "You call yourselves psychologists, you of the laboratory aprons and the white rats; but have you ever studied a single *person*?"

When the two approaches fuse, as they do in at least a partial sense in many of the studies of personality—as, for example, in the work of those who construct *tests* of personality—we discover that the product is still, for the most part, doubtful clinical psychology and questionable laboratory science. Some clinicians avoid the use of inventories and tests, having a fairly hearty contempt for them; and the laboratory psychologist finds that the reliabilities of many of the tests of personality are surprisingly low and their validities, as well as their theoretical meaning, as yet unknown. It is possible, for example, for a research worker to report on a test of "egocentricity" that has

a reliability of .86 But what can this egocentricity be when a second worker produces another test for "egocentricity," also with a high degree of reliability but with a low correlation with the first test of egocentricity? Which shall we call the *true* test of egocentricity? And what does egocentricity mean?

These problems are mentioned, not in the desire to belittle those workers who are trying to reduce the element of subjectivity in our estimates of personality, nor in any attempt to make the task seem insoluble; but merely to point out these pertinent considerations:

First. The course that must be followed before we shall arrive at any fool-proof testing procedure, which will enable us to obtain an index number of the personality and its traits, is going to be a long one (A long parenthesis, Kierkegaard would have said)

Second. We are far from being able to construct our synthetic picture of the normal person out of well-measured and clearly outlined parts There would seem to be much need for work at the analytic level first. It is by no means certain that we have isolated the variables we should be measuring. Certainly, those that give us the most objective and reliable measures are not—by virtue of this fact—the most valuable measures Knowing that a subject's reaction time to a flashing light has a mean value of 225 sigma with a standard deviation of 37 sigma is an interesting fact, perhaps; but it yields little insight into the structure of his personality, little knowledge of his normality or abnormality. On the other hand, knowing that a person has an unusually harsh super-ego may be an extremely important fact, although there is no test procedure that could assign an index-number to express this super-ego strength.

The Rough Standards of the Competent Judge

The psychologist who undertakes the construction of a picture of the *normal* personality meets with another difficulty. The very judgment "This is normal" implies two quite different things: on the one hand it may refer to the norm, or *average*, of a culture; on the other hand it may refer to a generally accepted set of values, or standards Yet these values are rarely explicit They reside in the practical judgment of the competent psychiatrist, a man who "knows" but who is frequently too busy to attempt to formulate the basis of his judgment. Often we rely on him for a decision as to what is normal, saying "Let the competent judge decide "

This, virtually, is Dr. Cameron's decision in the matter.¹ Let us not waste our time in fine-spun distinctions between normal and abnormal, and, especially let us not waste our time in drawing up a picture of the *ideal* personal-

ity, he seems to say The latter does not exist on sea or land. The normal includes that very large group who get along *adequately*, who are *competent* to handle their own affairs, whose responses seem *appropriate* when viewed against the cultural background They do not *over-react*, they do not *deviate* too widely. Now these terms are loose There are no index numbers or tests to use as criteria Only the competent judge can say when the deviation is wide enough to be called "abnormal" And the competent judge, as a rule, is so busy taking care of seriously disturbed persons—the depressed, the feeble-minded, the suicidal, the deluded, the incompetent, persons who are so patently unable to make the grade—that he has little patience with those who want to formulate explicit definitions or to set up a scale with index numbers Let the armchair theorists split hairs in their efforts to get a word for it. The competent judge is too busy.

Such a clinician is somewhat like an impatient practising artist who has little time for wordy discussions about the nature of beauty, the nature of the creative process. This busy artist is content to seize beauty where he finds it, eager to embody it in some permanent form, happy in recreating it—even if he must act on premises that remain implicit. Like George Bernard Shaw, he will say: Those who can, do; those who can't will make up for their creative impotence in teaching, analyzing, and passing critical comments upon matters of which they possess only the most profound ignorance And such a clinician might even add. "Any good clinician knows who is normal and who is abnormal!"

The Relativity of Norms

Beyond the difficulty of obtaining adequate figures for each of the significant dimensions of the personality, beyond the difficulty in making any black and white contrasts when behavior seems to be distributed on a continuum instead of falling neatly into clear-cut categories, there is the fact of cultural relativity. Acts which, in our culture, are distinct deviations, tabooed or frowned upon, and even considered to be a sign of some degenerative disease, are actually dignified, venerated, believed to have special value in some other culture. Among certain Siberian tribes (Yakhut) there are persons who are subject to recurrent, dissociated, trance states in which they speak and act in a peculiar manner, relating—as the natives believe—messages from the spirit world. In our culture they would be classed as hystericals, as unreliable people possibly suffering from some constitutional weakness in integrative powers, subject to states of partial dissociation similar to those that can be experimentally produced under hypnosis But in their own tribal culture they enjoy a special authority; their words are listened to in greatest

seriousness; and these "spiritual geniuses" are showered with gifts. It is worth noting that among these tribes the rate of incidence of such dissociated states is relatively high. The social matrix, like the maze with a tension-reducing reward at the end of one alley, seems to have the power of selecting and emphasizing certain identifiable human traits, *thereby actualizing potentialities* which remain unrealized elsewhere, and *increasing the frequency* of a pattern relatively rare in our culture.

So it is with the Hindu fakirs who produce changes in their very bodily tissues as they seek to achieve spiritual freedom by their yoga discipline. We look upon the tissue changes they show as "psychosomatic disorders"; for the changes in their digestive, circulatory, and respiratory mechanisms conform to no healthful pattern in our scheme of values. Yet these are counted to be "holy men" in India, and they are accorded the greatest veneration. If they are sick men, then it must be true that the society of which they are a part is sick, and they represent what that society calls its best. In this instance we are tempted to view a civilization as a device whereby groups of men can court mental illness, together, without realizing their own plight. These holy men of India, through their relinquishing of their grasp upon the material world (which we are foolish enough to believe to be real) through the wasting of their tissues (which they believe to be little more than a poor prison for their spirits) believe that they can obtain release from the bondage of fleshly appetites, approaching a state of union with the spiritual essence of the universe, achieving what must remain hidden from earthbound men. Freedom from want, from pain, from desire, from the flesh itself—this, they say, is the end of man.

Thus it is that those who trouble to make the effort, those who would set up a standard or norm by which to judge persons-as-a-whole, find themselves caught in the trap of cultural relativism. The search for clear-cut criteria for *truth*, *beauty*, and *goodness*, forces us to consider this problem. Truth for whom? Beauty for whom? For the Balinese? For the Friends of Modern Art? For the Newburyport Art and Historical Society? Truth for the Zuñi? Or for the missionary? So, when we raise the question of the normal we must ask: Normal for what culture? The Siberian tribe or metropolitan New York? If, as Sumner once suggested, "the mores can make anything *right*,"² then the normal person is either (1) the *modal* case on a curve of distribution of traits *in his society*, or (2) he is the one who can act most *effectively* in at least *seeming* conformity with the mores, ideals, and beliefs of a particular culture, or (3) the one who, like the saint (or the holy men of India) epitomizes the values of a culture, giving serious expression to that to which others are content to give mere lip service.

The exposure of the statistical and relativistic character of the norm produces a deep-seated uneasiness in most of us, and in some of us something akin to revulsion. The curse of relativism is that it so completely devaluates the inflated certainties of our own moral currency. That certainly is *not* the way we have been feeling about it. *Normal* ought to be *normal in any culture*. Whether they recognize it or not! It *ought* to be no mere statistical mode: *normal* is something good, sound, healthy, *right*. Right is Right, and truth is *Truth*. Just as there were regularities of the heavenly bodies before men discovered the laws that describe their courses, just as the Americas were here before Columbus set sail, there is—we are prone to insist—a moral law, a norm of health and productive living, whether our mores conform to it or no. And if other people were as well-informed, as intelligent about these matters as we are, they, too—we secretly believe—would agree.

And in our reaction to relativism, we rush to affirm a norm that will be true in Ohio or Timbuctoo. A hydrocephalic idiot will be an idiot in any culture. Whether the myths of his tribes are true or false, his mores good or evil, he will scarcely participate in them. He could not learn them if he would. So helpless is this deviant that unless his fellows created a protective screen around him, an impersonal Nature would eliminate him.

And the disorganization of behavior, and the loss in immediate memory (and in the ability to plan) which follow the loss of the frontal lobes, would make all possessors of such defective central nervous systems different from their fellows; they, too, would have to be protected and directed or incarcerated; they are really a-social, scarcely sharing in the dreams of tribal destiny that concern their associates.

The thought then arises. Could it be that we could make a comprehensive picture of the genus *Homo*, of his true and objective potentialities, abstracting from the partial views we get in the various *actualized* samples revealed by the anthropologist's specimens a conception of the type, the universal and ideal MAN? Could we grasp his *essence*, could we sense in one vivid moment of insight all that this *Homo sapiens* could become, all that is potential, all that is inherent in his very nature? Then we could say, of a given man: *He* is abnormal, he is something less than completely human. Having such a criterion we could measure any sample. Indeed, we could measure any culture and say: This culture is *sick* because it fails to develop the essential person, to actualize the best potentialities in its members. Then we should be able to lay down the dimensions along which our measurements of the whole person would be fruitful; for we would have seen what man *really* is.

This, incidentally, is the task Erich Fromm seems to set for himself in *Man for Himself*. He writes:

"The great tradition of humanistic ethical thought has laid the foundations for value systems based on man's autonomy and reason. These systems were built on the premise that in order to know what is good or bad for man one has to know the nature of man. They were, therefore, also fundamentally psychological inquiries. . . .

"I have written this book with the intention of reaffirming the validity of humanistic ethics, to show that our knowledge of human nature does not lead to ethical relativism but, on the contrary, to the conviction that the sources of norms for ethical conduct are to be found in man's nature itself; that moral norms are based upon man's inherent qualities, and that their *violation results in mental and emotional disintegration*. I shall attempt to show that the character structure of the mature and integrated personality, the productive character, constitutes the source and the basis of "virtue" and that "vice", in the last analysis, is indifference to one's own self and self-mutilation. Not self-renunciation nor selfishness but self-love, not the negation of the individual but the affirmation of his truly human self, are the supreme values of humanistic ethics. If man is to have confidence in values, he must know himself and the capacity of his nature for goodness and productiveness"*

This statement from Fromm, boiled down, means:

1. There is an *essential Homo sapiens*. The essence is discoverable, it will have the power to command consent.
2. If we could discover this true nature of man we would promptly know what he *ought* to do in order to be *himself*, truly—in order to actualize his innermost nature.
3. And the failure to live according to one's true nature flouts the basic moral law and results in:
 - a. "mental and emotional disintegration,"
 - b. human waste,
 - c. the fretful sense of one's failure to achieve that which is deeply implanted within one—the sense of alienation from one's true self.

In a sense this is a kind of neo-Thomism, a neo-Aristotelian affirmation of an essential nature of man, an affirmation of the worthwhileness of the quest for a kind of *absolute* psychology, a super-cultural understanding on whose groundwork we could draw up a new *rights of man* that would form the charter for right-living, a universal morality, and would at the same time provide the basis for growth, the joyful and productive life, the correct conception of grace and wisdom

* Erich Fromm, *Man for Himself* (Rinehart & Company, Inc., 1947), pp. 6-7. [Italics added.] Used by permission.

Merely to raise such questions has become, in many intellectual circles, a sign of inferior breeding, of naiveté. Social scientists are particularly sensitive on this point. Thus Margaret Mead asserts:

"The student of human disease who speaks of 'normal' and thinks that he means by that term the form that human behavior would 'naturally' take *if it were not distorted by environmental pressures*, who thinks in fact that he is speaking of a biological or basically human normal, is really always including in his definition that particular variant of human culture which his subjects use as their *basic instrument of survival*."*

Fromm, on the other hand, is deeply discontented with those who work in his own field, psychoanalytic psychiatry, because they have failed to rise above the local norms of their culture. He charges that Freud, for all his penetrating analysis of the motivations that underlie our surface actions, has virtually driven us into the position of being ashamed of the word "ideal"; for the moral ideal so frequently serves as a screen for those who have some private axe to grind, and the valued standard is so chronically misused as a rationalizing cloak for actions that run counter to the values. And beginning with the tradition of which Nietzsche was one of the most powerful exponents, Fromm traces down to the present—through pragmatism, through the operationism of the modern positivists—the development of a thoroughgoing disbelief, a scepticism that amounts almost to contempt for anyone who would be so simple and naive as to affirm the supra-cultural reality and coerciveness of any values or value systems. Paréto, the Italian sociologist, can be seen in the procession of scoffers: values, ideals, humanitarianism, Christianity—what are these but myths? They are weapons in the fight for power, they are carefully concealed derivations and residues. An intelligent (Paréto says) man should not be deceived by them.

Have you not discovered, these men all ask, that science deals with *facts*, with relations between events (relations capable of mathematical expression), with logically rigorous deductions of implications from postulates, with validations of such deductions, with prediction and control? And that ethics (and its norms) deals with the evaluating process, that it "never predicts the occurrence of anything" but merely evaluates if and when an event does occur, that its evaluations are not themselves capable of being validated, and are, therefore, neither true nor false? Instead of being compelling, these evaluations become matters of supreme indifference, arbitrary affirmations in an a-moral struggle for existence.³

* Margaret Mead, "The Concept of Culture and the Psychosomatic Approach," *Psychiatry*, 10 (1947), pp. 57-76. Used by permission.

The Paradox of Relativity

This, then, is our dilemma. Before we can make progress in the measurement and assessment of the person as a whole, in the understanding of normality and abnormality, we are required to achieve some clear conception of those ends and values that alone can decide which measurements will have *significance*. Yet the very discipline we have been pursuing, somewhat naively, confident in the worthwhileness of our pursuit, reveals the existence of a relativistic cultural trap: the values we shall affirm are no eternal values whatsoever—they are merely a “Hurrah for the values of our culture” (or of Middletown, or of “our set”). Our search for truth, for *the* truth about human beings, has taught us that the only truths extant are “modes of conceiving” which are embedded in a culture. Basically, the discoveries we can make about the world around us—the only discoveries we have made—are those that emerge when, living out our hopes and hypotheses shaped under local gods and myths, we test their validity with our very lives.

Knowing, therefore, the tentative character of any such formulation, and being aware that it will be related, inevitably, to a particular cultural matrix, a man still has to affirm the only kind of truth he can possess. Without the authority of any transcendental source, he realizes that such a truth can never enlist more than a limited consensus. But he also knows that the “truth” about human nature can be discovered only by men who dare first to affirm it, live by it, test it by their lives. No truths at all can be discovered by sitting back bemoaning our human dilemma, or by making endless “tests” for traits whose significance we have never seriously *lived*. The truths we achieve will be all the dearer for their intimate and uncertain origin; and if in the end we are left in ignorance it will not be for want of trying. The fact that our truths are “culturally bounded” should remind us of their tentative character; but this fact need not deter us.

Is there any other platform on which human beings can stand? Is it possible to transcend a culture without working out the implications (and the contradictions) of its values? Can we wait for the automatic emergence of concepts which, through some immaculate mode of conceiving, will spring directly into our cultural framework from some transcendental platform?

The Mature Person: A Tentative Conception of the Normal as the Ideal

If we divide our person, for descriptive purposes only, into three dimensions (affective, intellectual, social-volitional)—following the ancient and honorable custom of speaking of feeling, intellect, and will—we shall, of course, be taking up *seriatim* what is essentially a whole. We shall feel bound

to point out inter-relationships even as we describe the separate aspects; and we shall endeavor to sense the dynamic wholeness of that which the task of description forces us to separate. What makes one hesitate before this preliminary task is the fact that it is properly the task for an artist and a wise man.*

And who, realizing this, can have the temerity to even attempt the description of the normal self? Unless, like the fool who rushes in while angels themselves remain hesitant, he attempts merely a beginning which others will have to complete.

THE AFFECTIVE-EMOTIONAL DEVELOPMENT OF THE MATURE PERSON

1. The Persistent Emotional Tone

There is a persistent emotional tone which underlies all that we do. And in our normal person (viewed as the ideal one) we would like to conceive of it as the kind of tone that expresses a sense of security, of confidence, of courage that can sustain him in moments of stress or whenever he is frustrated or challenged. Though often puzzled and in doubt he will have an underlying assurance that answers can be found and solutions discovered. Fortunate man, indeed! Such an undercurrent of affective toning implies a ready support from the underlying energy stream; it implies both health and vigor of body, and a regimen of work and play and rest that enables a man to meet the pressures of tasks confronting him. Such a tone implies *homeostasis* (and more). In the place of a basic anxiety, which the literature of psychopathology so frequently stresses, we are postulating here a basic confidence, an expectancy of growth, progress, and achievement of goals. We are picturing a human being looking confidently into the future.

Such an affective toning must be, in part at least, the outcome of fortunate adjustments, it suggests that we are identifying a place, a locus, and an outcome of a fortunate history. For man does not have complete control over the press that plays upon him. The soldiers who landed on the Normandy beachhead and marched and fought against enemy resistance for thirty and even sixty days without relief reached such a point of exhaustion of their

* Note the observations of Theodore Reik in his *Listening with the Third Ear*. From the standpoint of analytic theory, which views repression as a way of avoiding pain, the only way in which one can gain a true experience of that vast hinterland of unconscious forces and of their determining force in conduct, is to have faced their role in one's own self-system. To have worked through one's own inner conflicts means to have experienced the painful awareness that comes with de-repression, with a re-assimilation of once-rejected areas of experience.

vital reserves that they could scarcely summon the needed physical energy to make even simple protective responses against the constant threats of death; and, for some, the mounting tide of anxiety passed entirely out of the bonds of control. Their very tissues began to break under the chronic tension: the major biological systems (cardiac, circulatory, respiratory, digestive) began to show disruptive changes. In naming the desired outcome we therefore ask at the same time for a history—a history in which the balance of pressures and needs, on the one hand, and capacities and coping mechanisms, on the other, has remained in the main on the sthenic side. There is an implication, here, that some “will promptly challenge. Man, some would urge, is born to pain and sorrow, “doomed to eternal frustration.” “He may be conditioned perhaps to accept intellectual limitations and death, but he will never know surcease from emotional deprivation.”⁴

If man is to remain—as Thomas Mann once put it—“life’s delicate child” then our first ideal is unattainable, a mere wish, pie in the mental hygiene sky, and our first *duty* is that of compassion (and resignation). If we are to achieve peace of mind, clarity, and integrity, we shall have to abandon unrealistic ends. “Born to pain and sorrow” or “made for joy and the sthenic mood,” man as we find him fluctuates between these poles. The fortunate ones—whom men of another day called the children of the gods—possess this “accent on the positive,” this expectancy of favorable outcomes. Some societies appear to maximize this mood while others maximize fear, insecurity, and the pessimistic mood.

We are estimating man’s possibilities when we set up our ideal; and in the very act of estimating we reveal our own hopes, our mood. If we pitch our ideal too high we risk the charge of being unrealistic, of making excessive claims which can only lead to poor adjustment, to (neurotic) disappointment, to a denial of reality. If we set it too low we betray that neurotic apathy and hopelessness which an unfavorable history naturally produces.

It is true that a “tippy-type” exists, a congenitally sensitive constitution. Only a special kind of handling, a special developmental course, can preserve this desired positive emotional tone in such a constitution. We know far too little about the biological roots of such genetically determined emotionality, its means of transmission, its developmental aspects. Roughly described under the term *temperament* it has plagued us in the form of typologies from the time of Aristotle to the present. Too often the mechanism of gene-transmission has been made to do duty for what is really a very complex historically determined set of adjustment mechanisms, and the lazy observer could always turn to some constitutional basis of emotionality to give a facile verbal explanation for what he could not factually

document and explain. Nevertheless, enough evidence has accumulated to demonstrate that organisms do not start out in life with the same kind of affective resonance to the environmental press. The mere jingling of a bunch of keys will set 80 per cent of the rats of one colony into audiogenic seizures resembling a kind of rat-epilepsy, whereas the same stimulus will effect only 2 or 3 per cent of a second strain, bred for "normality" (that is, resistance to seizures)

For our normal self we would wish, therefore, a balance between his own congenital capacities, his frustration-tolerance, and the press that operates upon these capacities. For whatever the temperament—choleric, sanguine, melancholy—whatever the constitutional endowment, it would seem possible to develop skillful methods of coping with the environment, a feeling of confidence and strength, *if* the intensity and pacing of these environmental stresses are adjusted to the capacities of the individual. And it is well to remember that there is a stress-point, a limit of tolerance, beyond which even the tough and the thick-skinned begin to break down. In the beginning *every* infant has a rather low limit of frustration tolerance. He does not possess the coping mechanisms, as yet, and his helplessness, his limited vital capacities, make him wholly dependent upon the nurturing care and the intelligence of those who surround him. We would wish, therefore, for a careful nurture at the very beginning of our normal person's history, so that relatively few press-situations in his later life will remind him of earlier catastrophes (Note that what we are trying to show—at the very moment we describe our ideal—is that it appears to be a contingent ideal, dependent upon and limited by conditions.)

It should be noted, too, that the strength of emotional fiber, the rugged but positively toned undercurrent of supporting energy, emerges not from a *chronically* easy life (where the *whole* course of development is *over*-protected) but from a graded series of experiences in which tolerable challenges are successfully overcome. There has to be a toughening process if our normal individual is to meet the shocks and challenges of a world that, at times, will show all too limited concern for either the wishes or the capacities of the individual. The tempering of the steel hardens the blade, and the working *through* of difficulties toughens the temperament until challenging tasks produce—not a collapse—but a mobilization of forces and an expectancy of and determination to achieve a solution.

Thus, in just stating the first requisite of the normal self we are asking for a genetic endowment and a life history, for a type of training, a pacing of development, and for a locus in a field of environmental press that is challenging enough to mobilize his powers, but neither so chronic nor so intense

as to overwhelm them. And it is clear that what we would like to see in our ideal case—this perfect balance of capacity-press-need—is violated in every degree among us ordinary mortals

Two reflections seem pertinent, at this point:

First. The mere attempt to set up a norm, or the ideal, for the mature self convinces us of the extent to which we, as individuals, and indeed our whole society, deviate from the norm. We can scarcely claim to be such a fortunate one; nor can we look at our society, as it exists, as a place for the successful breeding and development of such rugged, positively toned selves. We do just so-so

Second. And if we have not yet applied our existent knowledge to the tasks of providing minimum food and shelter for the growing young who are to be the mature persons of tomorrow, it is clear that though we can define our goal, it has not yet had sufficient pulling power to create for all men the conditions we know are essential. If this is our goal we *must* transform those conditions upon which its realization depends. Otherwise, though we show compassion for those who suffer, we confess our impotence or our insincerity.

2. Emotional Attitudes toward People

Coupled with this confidence, this freedom from fear and self-doubt, this ruggedness in the face of press, we would like to find a warmth, a sympathy, a “we-feeling,” at least toward that fairly broad group to which the individual belongs. Not indifference, not withdrawal, not hostility and suspicion; but a sense of community of interest, of belongingness, of being at home and being accepted. For human beings are social animals—they require such a feeling of acceptance for their peace of mind, for their very growth, and they require, objectively, a great amount of coöperative adjustment even in the satisfaction of their bare physical needs.

Again it is evident that in setting up a conception of a good affective attitude toward people we are involving ourselves in the description of a broader setting and a life history. How could a rational being develop such a set of feelings, or anticipations, in the first place, save in a stable family life where mutual trust and a ready expression of affection and understanding give the attitude a basis in reality. And where should we expect to find the opposite feelings (a chilly introversion or a paranoid suspicion) save in those who were surrounded in their early years by rejecting, fickle, immature parents? Neither the aggressive overprotectiveness of parents who mask a subtle hostility under excessive care, nor the listless indifference of a lazy and immature parent, provides the soil for the cultivation of the human

spirit. And there is a graded series of ever-widening groups within which our ideal person must develop. From family to play group to adult society the bonds of we-feeling have to be extended.

The preparation in the family may be good. The "progressive" nursery school and understanding teachers may nurture an expanding, cooperating we-feeling. Throughout his training, in church, in play-group, in college classes, the attitudes of sympathy, of belongingness, may be stressed. But his training would not have been a typical preparation for life in our society had it not prepared him to be on guard against "the enemy." Who the enemy is, in this far from perfect world, varies widely with the locus of the particular individual. The working class? The sixty-ninth street gang? The cops? The capitalists? The Negroes? The Jews? The Communists?

In our world, already organized into conflicting and competing groups, *they* are always there, a threat to our peace and security. Sometimes when our group is large and powerful, our mood is confident, expansive. (Let *them* shrink, display the suspicious and hostile view for our part we can forget and forgive. Why, some of our best friends are Jews.)

From either a fatuous complacency or a suspiciousness bordering on the psychotic we would hope that our ideal person would be saved; but the more we see that *his traits and his role are one*, the more we see that to make persons with truly *human* sympathies would require a world in which they could develop. Rather than indulging in Utopian fantasies let us look more closely at the problem as we meet it in the present world.

What we have been describing might be called, by a psychoanalyst, an "*extroversion of the libido*." It involves a degree of *identification* with others, a turning outward of interests, an expansion of the self-system to include others. Without undue fear, without excessive suspicion, distrust, or hostility, such a sense of mutuality or belongingness multiplies the strength of the individual. While his group stands solidly in the face of stress and while his role unites him with them, his strength and their strength are mutually supportive.

There is a social facilitation, an inter-individual intensification of responses in the group or the crowd—as social psychologists have long noted. The panic that mounts in the packed theatre at the wisp of smoke, set off by the cry of the one with the lowest threshold, reaches an intensity that solitary reactors do not achieve. The crowd's laughter at the comedian's jokes gives them a potency that they seem to lack in their retelling to a friend. So the supporting group gives each of its members a strength and confidence none would possess as a solitary individual.

And what we observe, *as existing now*, is a heterogeneous series of groups,

overlapping, interlocking, now supporting each other, now attempting to destroy one another. And the group imposes limits. The Hutterites may agree among themselves about the basic values, the proper way of rearing children, of founding a home, planting crops. But they also agree in condemning the alien views of the stranger. And if they equip their young with coping mechanisms that work among their own kind they also create the basis for maladjustment and anxiety should the young Hutterite sally forth into metropolitan society.

Thus each group *holds a code*, teaches values, stresses a way of life, provides a schedule. Commonly the individual bred in this group finds these ways and values satisfactory; they have an absoluteness about them (certainly in the heyday of the group). For these values are supported by a power structure which controls access to the means of subsistence and the satisfactions of wants. And conformity to these codes is the avenue to emotional security, to affection, to this mutuality of which we have been speaking.

Caught in the web of group life, internalizing the group's standards, the individual can scarcely be *human* (i.e., loyal to any over-arching dream of *man*). The very experiences that make Lloyd Warner's "lower-lower" a good Riverbrooker make him hostile to Hill Street. So Communist is pitted against Social Democrat, upper-upper against lower-lower.

Now what in the face of this unhappy state of affairs should we affirm as the road toward mental health? These seem to be the options.

1. Let each affirm ruthlessly the ways and values of his gang. As Nietzsche counselled the good European, "Be hard." Let the struggle for survival determine which gang can give the optimum strength to its members. *My fate is our fate.*
2. Let each affirm his own uniqueness with tolerance, compassion, and respect for the uniqueness of others. (It should be pointed out that this is really a *counsel* to revolt against or to *transcend* the conditions that have produced the person.) It is anti-Catholic, anti-Protestant, anti-Republican, anti-Democrat, anti-Jewish, anti-every effective morality.

The Dilemma:

1. Adopt *the morality* and the mores of a gang and *accept* the war of groups. This counsel urges the right to be prejudiced, the right to hate, to destroy. Consciously limiting its boundaries of tolerance the self, secure in its in-group, cries "Let *them* suffer!"
2. Accept *no* morality as absolute. This involves a distrust of every morality. The person becomes, here, a man without a country, a man without a

gang, without a supporting consensus. One can imagine such a person, who feels that he has transcended every morality, wandering among the moralities like a solitary stranger in a suburb—looking through the window upon families gathered around their television set—a little contemptuous, perhaps, and very lonely.

The pain of such loneliness is very real; and it undoubtedly underlies what Fromm has called the “Escape from Freedom.”

The one possibility that remains involves the creation of a new morality. This is the role played by those who wrote *The God that Failed*.⁵ Ex-Communists, ex-capitalists, these migrants have suffered; and they are virtually men without a culture. Yet they require this support by their peers; and in creating a kind of “Society of Disillusioned Revolutionaries” they are giving outward expression to a deep-seated human need, the need to feel at one with others.

Every germinal force in our intellectual history has tried to gather around him kindred spirits who, through their agreement, support and sustain him, giving him that sense of wholeness, integrity, sanity, which all men require. But at the very moment when such a group is formed and gathers strength, its members are faced with the same old dilemma. How shall they struggle for their place in the sun? Shall they ruthlessly attack all hitherto existing moralities or, with compassion, reason, wait for the slow course of education to crack the hard shell of other fighting faiths?

Only the strong can be tolerant, flexible, mobile, passing in and out of many groups, understanding, adapting, and accepting others as respected fellow-human-beings. For the process is disorganizing, anxiety-inducing. This means also that, just as a clinician might recommend, in a given case, a simplifying of the environment, we might also recommend a simplification of loyalties to the person who is trying to live on a too broadly human level. It is one thing to imagine what the ideal adjustment should be. It is quite another to indicate what is possible for a particular individual.

If we ask, “What is the course we should wish for our mature individual?” we shall have to choose between a breadth of tolerance, a breadth of identification, and a depth of certainty, a rigidity of convictions, a strength of prejudice. And we shall have to be prepared to accept the consequences of pitching our ideal on either plane. The breadth of tolerance requires a strong security system, and the depth of certainty threatens some of the goals we shall have to discuss in connection with intellectual growth. There is a conflict, seemingly, between our values.

3. The Capacity to Give and Receive Love

Pursuing the ideal, again, we would hope that our mature person would be able both to give and to receive love. In our culture love is not only a value, it is—as we pointed out earlier (page 222)—a highly romanticized value. And we noted that, contrary to the implication of our language, it has myriad meanings within different personality structures.

We can, perhaps, differentiate a wholesome love from the other types. It should not be the possessive kind of love—like that of the overprotective mother—which absorbs its object and, with little sensitivity for *its* needs, attempts to rework the object into its own image, or into a mere extension of its own self. It should not be the excessively dependent love which is mixed with anxiety, fearful lest the object will, for even a moment, turn its interests away. Nor should it be the love fantasied by the immature self, the “complete solution” to all of life’s problems. Neither should it be a completely sacrificial love, which demands of us a selflessness, a total surrender to another, an anchorage in some alter ego. It should be, rather, a relationship that nourishes us as we give, enriches us as we spend, and permits ego and alter to grow in mutual harmony. Lacking the techniques for creating or discovering such islands in a competitive world, the ego may withdraw, moving away from people lest in their demands they further weaken his security system, or he may go about continually in search of the blue flower of the perfect romance (as Stendhal apparently did, little realizing the parasitic nature of his own immature demands); or he may cynically reject the goal as a form of adolescent romanticism, seeking what he can get out of people and, in his tough young self, creating the very conditions that will finally validate his paranoid outlook.

On the other hand, our definition could scarcely require of each of us a love so expansive that it will embrace all others within the bonds of love and trust. Such an indiscriminating attitude would not promise great depth in any personal relationship; and in this present weary world, which contains so many immature, neurotic, and selfishly aggressive personalities, it would be a handicap and a source of hazard.

4. The Ability To Relax and Be Gay; and To Express Hostility

Where the three affective qualities we have described are present, we also expect to find the ability to relax, to be gay. Such “good nature” as we have described bubbles over in good humor. The barb on our mature person’s wit does not need to be so sharp, nor are his own defensive needs so great that he is unable to laugh at the joke directed toward himself. Here again it is

apparent that we are describing a position, a locus, an outcome of a developmental history, for it is a secure person who can do these things. Secure in a returned affection, confident in his skills, accepted in his cliques and in larger groups, he can act in this relaxed, good-humored way, winning further affection and support. A good life style is cumulative in its effects. The basic anxiety that produces rigidities and over-reactions is absent.

But this same underlying security and at-home-ness also permits the expression of hostility. That is, when the occasion demands it, and to the precise extent that it demands it, and no more. He does not need to suppress his objections or resistance (and to feel guilty or fearful) when anger arises; neither does he have to overdo it, and like a tantrum child (or the terrible Mr. Bang) weaken his case by indiscriminating explosiveness. Nor does he have to rationalize his angers by depicting his enemy as the devil incarnate, as the one all good people should *righteously* oppose, as the one who has no good in him. That is why a lack of sense of humor, deadly seriousness, undue sensitivity to criticism, as well as difficulty in expressing hostility, in a personality evaluation, indicate "slender resources" and a "basic insecurity."

5. Emotional Attitudes toward the Self

Such a self as we have tried to imagine, on the affective side, secure, confident, out-going, capable of giving and receiving affection, would also possess the "feel" of his own creative energies, the "feel" of being his own man, of being capable of making his own decisions, of being creative, of going somewhere. And, while we are anticipating what we shall want to develop in our description of the social-conative side of the ideal person, we would want him to have both the adequate motivations and the available energies for something more than an anxious, rear-guard, tension-reducing style of life. When, to save his skin, to keep soul and body together, to maintain an existence against odds, he has to devote all of his energies to the task of meeting a current press of threatening conditions (his health, his bills, his tottering status) he scarcely has the means for the good and happy life, for creative ventures. Again, we seem to be talking about a place, a role, a locus in a matrix. But we are also talking about a strategy, a style of campaigning.

The 40 per cent of America's families (and there were 29,400,000 at the time of this survey) who—according to our own government's figures—had, in 1935-36, a *family* income of less than \$970 per annum, must have found it difficult even to meet the basic needs for food, shelter, and clothing.* Can

* The U.S. Department of Commerce reports that by 1950 the per capita income in some of the "poor states" had risen as much as 200 to 212 per cent. The purchasing power of the dollar, in the meantime, had shrunk. The cost of living had risen about 75 per cent.

we be surprised that this group offered less than its share of the discoveries, the new modes of conceiving, which contribute to our social surplus? Or that the Chicago survey of Faris and Dunham found the rates of incidence of schizophrenia so much higher in the worst of the slum areas?⁶ The surprising fact is, rather, that when we count the toll of mental illness, of warped characters, of obsessive and anxious personalities which the mental hygienist deals with, the frequencies of these maladaptive life styles among the "haves" and the "have-nots" are surprisingly similar. It would appear that "workable" life styles are achieved even when the economic margin of safety is low; and, conversely, serious breaks in the personality structure occur almost as frequently above this line as below it. Perhaps "keeping up with the Jones's" has as many hazards as keeping out of the poorhouse.

What we are concerned with, here, in speaking of the attitude toward the self, is often something that is scarcely conscious. It arises out of an inner harmony between the person's ideals and his actual performance, out of a living-up to the best that is in him, out of having worked through rather than around (or away from) difficult situations. And, as we have come to understand the genesis of such inner harmony, it also reflects a kind of relation between the person and that group of significant persons who surround, support, challenge, and in turn depend upon him for his competencies. Neither egotistical nor complacent, neither fatuous in conceit nor guilt-ridden and inadequate, such an ideal self experiences a contentment and a peace of mind; and he can face his own limitations with a philosophic calm while he confronts the human dilemma with a reasonable equanimity. And, accepting himself, he can also accept others.

THE INTELLECTUAL DEVELOPMENT OF THE MATURE PERSON

1. The Achievement of Insight

First among the signs of intellectual maturity we would wish for an ideal person is the achievement of an insight into his own make-up, a realistic understanding of his own assets and liabilities, an understanding of his dominant trends and motivations. With such insight he can intelligently set about the realization of the best that is in him, the achievement of possible goals; and by the real growth in his assets a progressive reformulation of his goals can be made upon a real foundation of increasing strength. When the level of aspiration is too high, when a person is blind to his liabilities, then the outcomes of effort are chronically discouraging and the performance is

apt to grow weaker while fantasies soar, or projections of blame protect the damaged ego while the emotional by-products of discouragement, anxiety, and uncertainty accumulate.

It is equally important for a man to know the real abilities he possesses. The channeling of effort in a manner that utilizes these assets permits greater growth, produces indirect effects upon the social and emotional aspects of the self. This relationship between assets and liabilities and the role a person has elected to follow can be congenial or inharmonious. Certainly for our normal self we would wish for an insight that could form a basis for the most congenial choices possible.

Insight also means insight into needs. The clinician is keenly aware of the fact that it is possible to experience tensions without recognizing their true origin, to *have* needs without being aware of them or being able to admit them to the foreground of consciousness. Such unrecognized needs may affect our behavior; but they do not play their full or proper role in that field where our plans of action are being made. When our true needs are unrecognized there are residues of tension and even elements of surprise and shock as we face the outcomes of our own behavior; we stumble into predicaments that we had not consciously planned. Even our aim at the consciously selected target is deflected by the tensions we have neglected.

The "idols of the market place," the currently emphasized goals which all "top flight" personalities are pursuing (and the current agencies of publicity—radio, TV, tabloids, the slick magazines—all tell us what they are) can distract us. We say, in the depths of our insecurity and in our hunger for status, "I will be as *you* desire me," neglecting to consider that neither our real needs nor our assets and liabilities fit this pattern too closely.⁷ None of us wholly escapes that brand of foolishness which amuses adults as they look down upon the adolescent's dreams of becoming a movie star, an airline hostess, a television success. Tinsel and glamour, the plaudits of millions, the crowd of reporters about one at the night club—these, we imagine, have something to do with the hunger and thirst that is within us.

And the taboos of our clique can make it difficult for us to recognize some of our needs. ("No member of *our* set could desire *that!*") Our very ignorance both of our own nature and of our generic human-ness may prevent us from correctly appraising and thinking about our own tensional experiences. As a result of this combination of ignorance and of a distorting local press, we are able to "throb" and "emote" about the future; but our thinking and planning lack the explicit verbalization, the clear recognition of needs, without which our efforts to adjust to or to transform the environment are hampered. Hungering and thirsting for the satisfaction of something that is

deep within us, we displace our aims upon transitory pleasures, phantom and fleeting reputations, social position, freedom from entangling alliances. Having little insight into our own nature, we have not correctly interpreted the promptings within.

This seems to be one of the concerns of Karen Horney, who emphasizes the importance of our discovering our *real selves*—of coming to terms with them, of actualizing them. There runs throughout her discussions the implication that there is a “best” organization of needs which would result in a maximum of productivity, strength, and joyful living.⁸ But her association with neurotic patients fills her with the sense of their lack of insight, of the presence of phony goals and ego-ideals. Instead of seeing himself as he is, the individual both *idealizes* and *despises* himself, confuses his *persona* (or mask) with his true self.

As we grow up in a society that requires us to adjust to a variety of groups, to move out from the family circle into a broader social field, each of us learns to guard his words, to delay his responses, to think twice before he speaks, to deliberately withhold some part of his plans and thoughts. The conflicts in values and mores that we face as we move from group to group thrust at least a modicum of hypocrisy upon us. Even in protecting those we love from the full impact of our own imperfect egos we are required to exercise restraint. Yet all this can be accomplished with a certain amount of insight. We realize our hypocrisy and are fully aware that our outer appearance of friendliness is not matched by the inner reality (ambivalence or even hostility). And when the unwelcome stranger leaves our group we sometimes openly display the gap between the conduct we showed him and the thoughts we withheld. Social life trains each of us in these ways of hypocrisy. Yet there is a more subtle hypocrisy which creeps upon us unawares. Suppression merges imperceptibly into repression. The bargain we struck in order to keep peace in the family, in order to be a pleasant host, in order not to be an unpleasant member of the group, in order to avoid the jeers of calloused comrades, can corrupt insight, finally. Suppression and the delay of impulses can destroy our awareness of those impulses.

When we set up as our ideal a self with complete insight we are wishing for something that seems to be denied by the actual conditions of our life. We are asking the self to maintain, at all cost, a clear vision—no matter how diplomatic and socially facile he may be. We are asking him, while he is in Rome busily adjusting to the Romans, to maintain a wholly objective sense of what he is about, remembering the truths that he learned in the provinces, discounting all blandishments and flattery, speaking the truth to himself no

matter what he speaks aloud. We are asking, in short, for a split personality, for a Jesuitical person who—to adjust—knows how to dissemble. And we are asking for a constancy of inner standards that seems to lie beyond human capacity.*

Facing the two possibilities (the schizoid split or the subtle loss of self-consistency and integrity with the past) we might urge the ideal self to seek the most complete integrity at all costs, to speak the truth and shame the devil, to refuse to dissemble lest it cost him, ultimately, that gift without which the self can neither know nor realize itself

It should be pointed out that our wish for complete insight into the nature of our inner promptings implies a degree of perfection and wisdom in an imagined inner self. Certainly, with ordinary mortals, the striving for complete insight is fraught with consequences that run quite counter to other goals of the self-system. To be confident, to feel secure, adequate, to carry constantly an attitude that is positively toned, suggests a degree of complacency, self-satisfaction, or self-acceptance that may be quite incompatible with a wholly objective appraisal of the self *as of now*. Incomplete and imperfect as we are, we are not so devoid of imagination as to be unable to dream of something better. Nor are our standards so low or so opaque as to protect us from guilt or self-scorn should some recording angel be able to communicate to us a precise and objective account of ourselves as we are. There are very few of us who could stand such a strong searchlight. This is another factor leading us to exclude, deny, reduce our intra-psychic conflict through distortions, exaggerations. The awareness of our failure to achieve those well-loved ideals is painful. In the vindictive individual with a strong "superiority complex" it is apt to be extremely so, for the very violence of his contempt for others is aroused against his own fumbling efforts, which link him with those he despises. Either it is the duty of our friends to preserve our illusions, granting to us a compassion that they expect to receive from us, or it is our duty to keep a sharpened insight focussed upon our performance as we struggle painfully to grow in the direction of the ideal. Or perhaps, when the tensions mount, we shall have to turn to the lobotomy, which blots out such painful awareness, relinquishing the long struggle to make the moral progress that alone can reduce the gap between the two.

The problem of insight may be stated in the form of an option.

* Even in the course of a brief series of judgments of lifted weights the single interposed experience of lifting a heavier weight interferes with the paired comparison (standard and test weight). The missionary who returns from a year of living with parishioners whose skins are dark is suddenly struck by the "paleness," the unhealthy color, of his friends. Thus, without his intending it, the visitor to Rome begins to apply a new base, a new standard, in his judgments.

The Option

The struggle to maintain insight.
 Respect for objective appraisals.
 Tolerance of the pains of growth and a retention of the clear awareness of the gap between the goals and the true accomplishments.
 The struggle against every deflecting emphasis that comes from an immediate social field.
 The tolerance for those interpersonal tensions that must arise if intrapsychic integrity is to be maintained at all cost (non-conformity, plain speaking, and the like).
 Acceptance of the risk of being regarded as a failure, as not "living up" to our capacities.

The abandonment of a faith in, or quest for, a life that is both rational and good.
 Dependence upon external authority, and surrender of the "protestant's" right to self-determination.
 Emphasis upon adjustment, conformity, and both utilization and acceptance of current rationalizations.
 Acceptance of goals and schedules that are available and currently valued.
 Emphasis upon the persona and a denial of impulses that interfere with conforming

Facing this dilemma helps us to understand what Nietzsche meant by the phrase, "Even in every desire for knowledge there is a drop of cruelty."⁹ With compassion we might say, of ordinary souls like ourselves: "Fortunate indeed the one who does not possess too much insight. For with perfect insight there must go a ruthlessness evaluation of the self, a surgical readiness to cut away the soft and messy portions of the ego, and a tolerance for pain both within the ego and within the field of interpersonal relationships." It is not certain that man would elect a full stature of mental maturity that involved such pain, or that—electing it—men would be happier creatures to have about. Even the ideal self (if we are talking about anything that human beings can accept as worth their striving to approximate) would need to feel confidence in his strength and tolerance of un-pleasure to dare to seek full insight.

Psychologists, who seem inclined to place the pleasure-principle high in the hierarchy of forces or regulative principles, are faced with this dilemma. Either they mean to say that the chances are very much against men seeking too great a degree of insight (and hence they will prefer every comfortable illusion) or there is some deeper force, some higher joy in achieving even that painful sense of integrity that goes with insight. It is not written, anywhere, that full insight will promote homeostasis (reducing all biological tensions, bringing states of euphoria) nor that it will promote adjustment, conformity, acceptance by the group.

In a recent study of Nietzsche a biographer uses the phrase: "Truth is great even though it does not prevail."¹⁰ And Romain Rolland once expressed our

dilemma when he made his youthful hero in *Jean Christophe* exclaim: "To love, to seek, to grasp Truth, the lovely Penthesilia, Queen of the Amazons, whose teeth bite in answer to a kiss"¹¹

2. An Accurate Knowledge of Men and Affairs

The other side of the medal, inseparable from and contributory to the insight into one's own nature, is that accurate knowledge of men and affairs necessary for a correctly conceived "life space." For the ego to know itself the alter must be correctly appraised, the relationship is bi-polar. A strong sense of the real involves both ego and alter.

If insights about the world, or about the self, are to be even approximately complete or adequate, they will have to be verbalized, reflected upon, structured. Mere empirical "know-how" developed out of limited and local experience is scarcely enough. To depend upon a compound of hunches, guesses, feelings, is something like shooting from the hip, it is required in emergencies but not to be chosen when ammunition is low, the game scarce. Since the best concepts come to those who seek them, our ideal person will be reflective, engaged—at least some of the time—in the task of transmuting raw experience into an ordered view of life as a whole. Knowing as we do that the best of his potentialities will scarcely transcend the culture, we could hope that our ideal person would seek the deepest participation in the cultural stream possible. Knowing who he is, or where he is, or what his world is like arises out of his discovery of all that the historians, artists, scientists, and philosophers have to tell him. Through the experience of thousands of other symbol-users his own perceptions can be sharpened and he can become aware of what-follows-what in a wider realm than that provided by his own brief and limited explorations. He will use the voyages of other men to broaden his own horizons.

Now when we so state our goal for the intellectual development of the individual it sounds as though we were making him a perennial student, a kind of idealized professor. Will he not find his concepts in the books, and will he not be able to acquire—almost ready-made—the high-power vocabulary of science and philosophy by becoming a reader, a vicarious experiencer of the discoveries of other men? And can we not measure his accurate knowledge of men and affairs by the IQ test, which measures a kind of skill in symbol usage, a knowledge of relations, a capacity to observe, remember, and report? And are we not talking about that intelligence—the admixture of nature and nurture that the testers have been busily measuring, now, for half a century? Here, it would seem, is one aspect of the mature person for which we have ready-made tests.

The consensus among clinicians is somewhat puzzling, at first. Every one of them will use the tests, and count them significant measures of *something*. But nearly all of the clinicians will prefer to use them in a somewhat negative fashion (that is, as an index showing limits in capacity). The report of the Office of Strategic Services, summarizing the experience of those who tried to select men for the most important military missions in World War II, looks upon the IQ scores as indicating the presence of those *pieces* of intellect: a vocabulary item here, a capacity for immediate recall there, a sentence-reconstruction there. But they did not accept the scores as an adequate measure of *effective* intelligence, as an adequate measure of those who would have the imagination, the organizing power, the inventiveness and skill necessary to solve practical problems. And the scores were rejected as measures of a capacity to observe and report accurately upon, or to adjust to, men and affairs. With a low IQ a person is handicapped. With a high IQ a man can still be an *idiot savant* in practical life ¹².

These clinical judgments sound harsh; but there is an authentic observation behind them. It is apparent that acquiring verbalizations and *using* them effectively in living are two quite independent tasks. It is possible to acquire all the major concepts in psychology—so that an individual could pass all the set examinations on subject matter—and yet be a psychological dunce in dealings with his fellow man; to get an A in “Psychology of Adolescence” and to fail miserably as a camp counsellor (And this fact, we may note, is a pungent comment on what we euphemistically call “the higher education”)

When Lewis Terman followed up his gifted children, originally selected for study on the basis of test scores indicating that they possessed a capacity found in but one in a thousand, he found that 15 per cent reported some maladjustment, and 4 per cent were classified as seriously maladjusted. In addition to the latter group, 1.3 per cent were psychotic. (Expectancy rates, computed by Pollock for similar age and sex groupings among average samples, showed that 1.45 per cent were psychotic.) Alcoholism was present in 1.5 per cent of the men and 1 per cent of the women of Terman’s sample. If we take these extreme deviations as a measure of their “normality” the figures would seem to indicate that the possession of high IQ’s has not given this group any great margin of safety. This judgment is given added weight when we note that in physical status (health, anthropometric indices) and in socioeconomic position the group is well above the medians for our society.¹³

The insight into men and affairs that we would wish for our mature self involves a capacity to read from and practice in the living scene itself. It is a practiced and an effective knowledge of men and affairs that is required.

3. Social Skills

In addition to insights and understandings our ideal person will possess the skills required in dealing with his world, both the social and the impersonal. In fact it is in his *actions* that his insights are finally validated. Since life is not a mere matter of looking at or feeling about the world, but also involves us in active participation in it, the means of realizing our motives, of demonstrating our understanding, are all-important. The mature intellect is, therefore, no quiz-kid type of intelligence which can verbalize an encyclopedic set of answers to verbally posed questions. It looks, instead, upon life itself (not upon some symbolic expression of life) and—responsive to its own needs—finds coping mechanisms as well as concepts that will effectively relate the ego to its matrix; coping mechanisms that are congenial to a more or less unique self, coping mechanisms that respect the nature of the matrix.

Since man is so very much a social creature, so dependent for his fulfillment upon the enlistment of aid, the establishment of rapport, among the most important skills are those constituting an articulate and fluent means of expression. To be able to say precisely what he means, to add the emphasis and tone that will convey the almost unique affective qualities of experience, to possess a style congenial to the spirit that uses it—these would be important gifts for our ideal person.

But a style is only an instrument, and communication is between selves. Though we speak with high-power concepts, though we understand precisely what-follows-what in an impersonal world, unless we have insight into the nature of the selves with whom we are struggling to communicate, our words are but small change; they purchase neither understanding nor cooperation. This insight into the *others* is required as a basis of communication, even as action and communication are required in shaping and validating our insight.

And while we speak of the powers of expression, we might add a note on the powers of silence. The virtue of silence was noted by the OSS Assessment Staff. Perhaps their task made them unusually sensitive to this aspect of the problem. Certainly officers in the “hush-hush” branches of intelligence work must know how to keep silent. At any rate the group engaged in assessing these candidates were especially sensitive to the “one who blabs,” who continually talks out of turn, who does not understand the virtue of not speaking.

So it is with the mature person who attempts to do psychiatric work, or counseling. It was the virtue of a somewhat silent, permissive technique, that enabled Freud to discover the deeper layers of the human personality. What the counselor can discover about a person is often strictly limited by the first

leading questions; and he can make hasty interpretations before his interviewee has had a chance to express what is really on his mind. The therapist can be a *force*, determining each subsequent remark of the patient, but he can be a very poor measuring instrument, a poor listener, a poor discoverer of other selves.

4. Powers of Synthesis

For all his flashes of insight, his wide-ranging collection of skills, concepts, coping mechanisms, our mature person will be unable to use them without powers of synthesis, powers of integration. He will be like the lobectomized patient—superior in intelligence, inferior in all performances. Though his vocabulary remains brilliant, his is the bird-like intellect, flitting from perch to perch with little continuity or direction.

The span of these integrative powers depends upon so very many factors that one almost despairs of ever devising a simple measure of them. What Janet described as “psychological tension” can rise and fall with rest and the depletion of our energies; it expands as our experience widens the field of our anticipations and an area of freedom is built around us, it is strengthened by the very success of our enterprises. The weak and the insecure are unable to reflect, unable to postpone action while a more certain plan is devised. They must “spill it,” make *some* kind of a stab at it; they cannot withhold, store, delay, work through to consequences, wait for the go-ahead signal. At the extreme is the psychopath, so poorly organized that each impulse rushes out to expression almost as soon as it arises. And there is another variant in which the anxious one, obsessed by doubt, cannot bring his deliberation through to the point of action.

The integrative powers of the intellect turn out to be powers of an entire self-system. Like the capacity to love, discussed above, or the dominant emotional tone, these powers betray the whole individual; they are determined by his history, by the kind of press he is operating under, by the momentary states of rest and fatigue, and the like. No simple, genetically determined essence will cover such powers—although, as in the case of emotionality, there is an undoubted biological component involved. The powers themselves are the outcome of a long developmental process in which the ebb and flow of changes have constantly involved both the organism and its milieu.

We can use the language of Gestalt psychology to describe this dimension of the intellect. Every stimulus has a context. Every change that affects us is a change in some field with which we are at the moment effectively engaged. The stimulus—for all its intrinsic powers—gets its meaning from the way its

effects mesh into this larger background. The gray on the white background has different powers from the gray on the black background, the story that is so amusing in the Pullman smoker has undergone a sea-change when reconsidered in Aunt Emma's parlour.

Now contexts are arranged in hierarchic fashion, wheels within wheels. How wide, typically, is this person's field? The child is especially apt to act within a small "here and now." The adult has added both a past and a future frame of reference, and the "now" has spread to a wide contemporary field. At times he can act almost as a world citizen.

But in this capacity men vary. The inebriate, on a Sunday afternoon, half dozing as he waits for his hangover to pass, is scarcely aware of the passer-by, of the square and the wheeling pigeons. His field has shrunk to a dull and painful here and now, to the buzzing fly boring in, to a vague but definitely unpleasant feel of his present state. The fatigued person is similarly too tired to lift his sights to the horizon of tomorrow, or to be serious about the remote present. And the neurotic and hypochondriacal are so preoccupied with their own petty fortunes, their own rearguard defenses and their own bodily sensations, that *others* scarcely enter their field, save possibly as *means* (that is, as agencies rather than as persons).

And the rest of us, in varying degrees, show a provincialism, a smallness, and a narrowness of the self. Small-town minds, middle-class minds, sophomore minds. Objects and persons, therefore, have limited meanings, even local and distorted meanings.

Illness, fatigue, severe mental conflicts, defeat, chronic frustration, all tend to restrict the field. We figuratively "pull in our horns," retreat within our inner stockade. Our "powers of synthesis"—as though in a process of automatic self-repair—adjust the field to a size we can successfully organize. In order to make a good configuration we limit the scope of the synthesizing task. We drop our membership in the club whose members we cannot assimilate.

For every person there is a field—indeed for every stage of development, for every turn of our personal fortunes. Though we discuss this field as though it were an intellectual factor—and, indeed, it is, for the field provides the background upon which every object is seen—it is obviously connected with the whole affective-volitional-organic makeup of man. In the senile personality, which so characteristically cannot retain and synthesize an immediate past with the present, we see the physiology of ageing arteries and atrophied cortical cells relentlessly pulling in the boundaries of the field, no matter what the personal history has been.

And in the Korsakoff syndrome, which may follow carbon monoxide

poisoning or chronic alcoholism, we can see the patient deteriorate to one who answers the dinner bell, the pressure of the bladder, the onset of fatigue; but he has become one who cannot carry the half of a conversation that demands a field embracing another self.

Thus we can see that the power of synthesis, instead of being some pure and unalloyed intellectual trait, expresses a state and a stage of a developing organism, with cellular chemistry and personal success equally relevant as causal agents.

5. A Philosophy of Life

Summated, the intellectual traits we have been describing culminate in an adequate philosophy of life, in the ability—as Matthew Arnold used to describe it—to see life steadily and to see it whole¹⁴ If the term *religion* is broadly defined, we are here speaking of our ideal person's religious beliefs. Since we are not defining our ideal person for the benefit of any cult or for any particular tradition within our culture, we hesitate to speak too precisely here; but we could scarcely wish him to “seek the deepest participation in the cultural stream possible” without expecting him to have given thoughtful consideration to, and to have come to terms with, the religious question. How could he claim to be anything but shallow, otherwise? And how could he possess an insight into the lives of so many of his fellows who find in religion a central core of meaning for life?

He may emerge agnostic and free-thinker, devout believer, or anti-clerical; but at the very least he should have given his own serious thought to these questions. And if he is not to remain—as Santayana once described the philosopher—a lonely ruminating rhinoceros, he will have made serious efforts to create or discover a group of congenial spirits who provide that supporting consensus which our not-too-potent rationality requires.

There are, of course, philosophies and philosophies, religions and religions. These are the grand fantasies, the ultimate extrapolations which give meaning and shape to life. They are the over-arching schemata into which we seek to fit our lives. Well-loved, and—as we strive to live by them—saturated with an investment of interest, they are the brakes that give poise and self-consistency to a creature of impulse.

The good philosophies, the good religions, endow their possessors with a steadiness, an assurance, a creative power. Looked at from the point of their origins, these healthy religions are the natural outgrowth of the healthy life style; but they also feed back a sthenic, organizing, steadying, and sustaining influence—particularly when these are shared views embodied in the lives of fellow believers.

But there are also world-weary religions, decadent philosophies, religions that express (and at the same time reinfect the sick soul with) poisonous doubt, guilt, fear, deepening the sense of frustration and despair out of which they arise. There are philosophies that are cynical, "know-nothing," confessions of man's impotence, of the meaninglessness of life, of the futility of striving. There are philosophies and religions of escape, of otherworldliness, of denial. *Caveat emptor!*

THE SOCIAL-VOLITIONAL ASPECTS OF THE MATURE PERSON: Individual Goals in a Field of Shared Values; the Acting and Willing Individual.

In looking at the third aspect of our ideal person (the one whom each of us would grant does not now exist, the one whom we recognize that we would wish to be, perhaps the one we *ought* to become) we are more closely bound up with actions, with the volitional aspect of the personality—although we have seen that intellect and affectivity cannot be considered apart from the actions, successful and unsuccessful, sthenic and asthenic, which teach us, shape us, strengthen or break us, widen or restrict our psychological field.

1. The Productive Character

What Erich Fromm describes as the productive character seems very like what we would wish our ideal person to be. This productive self realizes, actualizes, brings to fruition the potentialities that are within him. Whatever his biological limitations, he acts as though obeying that passage of Carlyle's in which the dour Scot cried:

"Produce! Produce! Were it but the pitifullest infinitesimal fraction of a Product, produce it, in God's name! 'Tis the utmost thou hast in thee: out with it, then. Up, up! Whatsoever thy hand findeth to do, do it with thy whole might. Work while it is called To-day; for the Night cometh, wherein no man can work."*

We could wish for our ideal person that release of the productive forces that would correspond, in the psychological realm, to that release in the economic field brought about by the Industrial Revolution. A strong self—to pursue the analogy a little further—transforms the materials about it even as a highly productive industrialized society transforms raw materials into

* Thomas Carlyle, *Sartor Resartus* (Thomas Y. Crowell Company), p. 205.

marketable products. As the strong self gnaws its way into the future it creates, transforms, assimilates, puts its stamp upon the world.

Yet if we have profited from our study of psychology we will know that *will* is no primal force, no original essence, no vital spirit bringing to life an otherwise inert set of structures; and self-realization, the actualization of potentialities, cannot come to pass merely because we wish it. The kind of exhortation we quoted from Carlyle almost brings the blush to our cheeks, as psychologists; for who, if he could, would not produce? Who would not actualize, release the productive forces, become—that is—the very most that he could? Such an actualization process rests upon conditions. Of this psychology is continually persuading us. In the first place, there are those conditions that make life possible at all—the family frame of persons with their own wishes, strengths, and weaknesses, a frame with the power to set the direction, the pace, and the ceiling of this self-actualization process long before we, as responsible, reasoning, agents are able either to critically evaluate these matters or to oppose a strong enough counter force to thwart their influences. At any rate there is evidence enough to show that they do frequently set a ceiling to our growth, that they can create peculiar and unique needs by the very way they handle us, strengthening our ego here and weakening it there

And beyond the matter of the self-actualization of one ego there is the patent fact that as we actualize ourselves we often collide with other egos. Gnawing our way into the future we collide with other egos, also busily gnawing. The conflict of forces within us, as one impulse collides with another, is duplicated in the outer conflict between egos, and some of the conflict within us is the internalized residue of interpersonal conflicts. A resolution of these conflicts that will at the same time release the powers of each of the interacting egos sets a problem in the organization of forces. In the integration of our powers we shall attempt to find that optimum release of which we speak. Mere strength of the impulses, or of the single ego, is not enough.

Here, once more, we seem to be speaking of a place, a history, an organization of forces that will permit the productive character to develop.

The problem for the self is not unlike the one that arises in the field of economics and politics. How can one nation grow (and especially as nations are now constituted) save at the expense of another nation? How can *we* produce save at the expense of *their* markets? How can the products of labor be redistributed without robbing those who now benefit to pay those who are deprived? How, indeed, save through some basic changes in the organization of our national and international economies?

It is not otherwise within the individual ego. The increases in productivity, in the fullness of life, require a redistribution and reorganization of energies

Two or three aspects of this ideal of the productive self are worth a word or two of comment. Perhaps no testimonials are needed to remind us of the satisfactions, the positive joy, in living productively. Each of us has experienced those moments when he has successfully put the stamp of his own creative powers upon the raw materials of life. In however humble a form (executing a dance, writing a theme, building a boat, baking a pie, giving a successful party) the lift that comes with achievement is a real psychological gain—a psychic income, Janet would call it—which heightens our capital. Like a prudent investment it continues to renew our resources, to widen our psychological field, to strengthen our confidence, even though the creative successes are humble ones. “To have the sense of creative activity is *the* great happiness and the great proof of being alive,” Matthew Arnold wrote.¹⁵

Those who appreciate this productive ideal most fully do not invite us to some grim and unhappy kind of living, a dour and ascetic life of deprivation, but rather to the richest and most joyous kind of existence. And the fact that each of us has glimpsed the truth at one moment or another, has felt the thrill of the truly creative act, leaves us with the real mystery, the real psychological problem. “Why,” we may well ask, “in view of its potency, does not this moment wholly dominate us, reorienting our endeavors, selecting out and stamping in until we come to devote ourselves wholly to that for which we were intended?” Thorndike, with his eye upon the pleasure and satisfaction that come with the simple fulfillment of our animal needs, made the pleasure of release from deficits and tensions the great stamper-in, the selector. And there, too, is one of the cornerstones of Hull’s psychological system—his explanation of learning, the principle of reinforcement. Why, if there is any truth in the testimonials of those who have experienced the difference between mere pleasure and the joy of truly creative living, aren’t we all basically creative artists? Can there be any such basic tension?

Freud tripped upon this problem, too. Inclined at first to elevate the pleasure principle to the position of the main directive force, to put the wish behind the dream, the neurotic symptom, the creative act itself, he found that he could not face the facts with this simple equipment. There are pleasures in destruction, even self-destruction. Beside the creative force of Eros he pointed to Thanatos, a destructive monster within us which, happily for our very existence, usually gets turned outward. And he felt forced to add a third principle, the mechanically operating repetition-compulsion to which he turned when there seemed no gain, either erotic or destructive, from the mere repetition of an act or idea. But the basic source of our non-produc-

tivity, he felt, was the fact that our creative forces become—in the course of our development, and particularly in the earliest years—bound within a snarl of mutually cancelling forces. Eros and Thanatos are set at each other's throats, the mind becomes split into two layers, and the ego plans its actions unaware of the combat beneath the stairs, a combat that diverts the life force into symptoms, depletes energies. In fact it was to free the forces that Freud worked out his analytic theory, to release the energy frozen in this senseless combat, to restore the power to set realizable conscious goals. The psychoanalyst's answer to our basic question is simple: You *cannot* make yourself more productive without the aid of analytic insight. Ordinarily this has to come from without.

"Something has to happen (to the individual), some new and effective causal influence, in order for him to be released from the compulsion to repeat the same behavior and the same symptoms. . . . Psychotherapy, far from requiring freedom to choose in order to influence patients treated, itself operates deterministically to achieve for the patient (this) subjective sense of freedom."*

Another approach is sometimes made by the moralist who is preoccupied with ethical problems arising when the individual tries to create the *good* life. We quoted one of the followers of Gandhi, earlier, on the question of moral force (see page 784) and it was evident that he wished to posit some primary power, existing in each of us, some productive, barrier-transcending force.

To live productively and creatively in this sense (to *demonstrate* that the self possesses such "moral force") is to be able to show that he knows how to set limits, to promise himself a future, to set standards and to achieve them. In short, such a self lives up to his "lights." Yet this moral force is to be distinguished from mere intellect or mere organic strength. According to Gandhi and his followers it is only when the individual surrenders purely egoistic aims and lives according to the two cardinal principles of *love* and *truth* that this moral force can grow within him. In Gandhi's autobiographic account of his "experiments with truth" (as he called his autobiographic writings) we can see the "saint" testing the validity of his ascetic ideals, testing the power of actions motivated by love, testing the supporting strength of a faith in an over-arching power which supported him. To fully understand his philosophy we would have to appreciate a whole Hindu tradition, indeed, we would have to *live* by that tradition.

To one who is saturated in the beliefs of our Western tradition—including

* Robert Knight, "Determinism, Freedom, and Psychotherapy," *Psychiatry*, 9, (1946), pp. 251-262. Used by permission.

our psychology of human growth and development—a faith in such an indwelling force in every man is difficult to achieve. Even Gandhi's disciple (in the quotation referred to) seemed to falter, and to admit that there are philosophical and religious systems that can weaken it, conditions of extreme environmental press that all but destroy it. And in our own system of thinking where we search for laws that relate man's behavior to the material conditions of his existence, the more our search succeeds the more we seem to bind the individual within the web of circumstances that has made him what he is. Behavior is *caused*, we insist. Man, we say, *is* a complex physical object moving through a world of physical energies. Man is a creature whose forced movements sometimes eventuate in a psychopathic personality and sometimes into sainthood. Man is a creature of those forces that surrounded him in his early childhood, of those cultural matrices that shaped him into a person-with-a-role, a person with a way of structuring his environment.

When all the lines of force are drawn within this structured field which embraces and determines the individual, there is little room, indeed, for any such concept as the creative life, the productive person, or for moral force. Or when such a productive life appears, are we not often puzzled to account for the way in which it has triumphed over barriers that prove too much for others? Pushing our enthusiasm for knowledge to its limits (and knowledge *is* power) when we face the task of achieving full "normality" for ourselves or for our children, we have to confess to our limitations in both knowledge and power.

If we look merely at the raw materials out of which man is constructed, the productive person is quite unimpressive. His body will yield, upon chemical analysis, the same amount of soda-ash, water, potassium, calcium that his psychopathic brother produces. His strength of grip may not surpass that of the average sixteen-year-old; and his familiarity with the classics and his general literacy (and shall we add, *even* his scientific knowledge?) may be very limited. Yet he lives productively, speaks with a simple wisdom, sets his own goals and achieves them, fulfills his promises, and discovers a joy and tang in living that transcend the mere security goal of tension-reduction, of peace of mind.

Whatever our basic postulates this fact must be faced. Some men achieve an *organization* of their life that is productive, self-consistent, purposive. Not only do they *feel* free; in their ability to set goals and achieve them they are *objectively* free. Other men, on the contrary, seem to have their goals set for them, they feel helpless, shoved about. Instead of acting with integrity they feel constrained to achieve what Fromm calls the marketplace personality. Their formula is: "I will be what *you* please—wear the right collar,

drink with the men of distinction, wash like the movie stars, deodorize myself and my dog with chlorophyll—be a thoroughly pleasing personality.” Instead of creative action such a person finds room for fence-mending, security-seeking. He is preoccupied with organizing a retreat. Instead of joy, the object of his quest is freedom from pain. Instead of exploring new ideas, he will be content with ritual. The *same* world—the world of cause and effect, the world of the geographers and astronomers, the world of physics and physiology, the world of conditioned reflexes and of insights that depend upon the juxtaposition of spatial fields—is a trap for one, a field of exciting adventure for another.

A physician who would heal sick souls cannot escape seeing these differences. Pierre Janet saw the lack of this creative force as essentially rooted in an exhaustion of mental energy; and he described his patients, the susceptible ones, as “fatiguables.” Erich Fromm, without too clear a statement as to his conception of the *conditions* upon which the differences rest, sees the development of the productive pattern of living as the crux of the ethical problem: the sick soul is suffering from a failure to live up to that best which is within him; and his symptoms function as a kind of bribe to the super-ego. Freud saw the task of healing such individuals as one of releasing them from the unconscious and fixated forces of instinct which infancy had so hopelessly tangled. And dozens of writers see the failure in growth toward productivity as essentially a vital failure, as a weakness in the forces with which the individual is originally endowed, as arising from a tainted inheritance.

What *are* the barriers to creative living? What is it, really, that traps both neurotics and many so-called normals within that prison-house of the spirit where men feel helpless, dull, uninspired? What robs the individual of that moral force which enables some men to set goals, make promises; and, conversely, where and how do some seem to discover it? Is there a science of human behavior which can lay bare the structure of this problem so that he who reads may discover what he must do; and can ordinary human beings, preoccupied with their immediately pressing plans and needs, utilize this science?

Moralist, eugenicist, psychiatrist, psychologist, sociologist, all proffer their answers. Too frequently they are one-variable answers: this, and this alone, is the one thing necessary. Sometimes they are mere exhortations, encouragements to man to act in a manner contrary to his present tendencies. Apparently it is only a self that already possesses some freedom that can take on the problem of utilizing these proffered answers for his own further growth. The rest of us feel helpless, caught in the web of causation; and we wait for the *deus ex machina*, or the psychiatrist, or the social-worker, or for the revolu-

tion which will usher in Utopia and that set of conditions which will *force* us all to become productive selves. Our design for living is passive; and we save our selves from the stress entailed in assuming moral responsibility for our fate by projecting upon *others*, upon *outside* conditions, the blame for our present state. Even our psychology is neurotically employed.

And when we have arrived at this point we discover that we, too, have joined the ranks of the exhorters. We need not feel so helpless. We have resources for experiment and adventure, we have scattered bits of knowledge of those conditions that give accent to the sthenic mood, and some of these conditions are attainable. The illusion of helplessness is as far from the truth as the illusion of complete freedom; yet the veil that conceals from us the path toward a better organization of our lives—gossamer-thin though it is—is sufficient to keep us “within the bounds of ordinance.” Habits, the conditioned reflex studies tell us, can be easily extinguished; yet when they are locked within a round of reinforcing circumstances they seem to be powerful conservative agents. The will, like Gulliver, is bound by a thousand tiny threads.

2. Self-Realization and the Participation in Socially Significant Purposes

A part of the determination of this productivity, of this growth of the strong character, rests—as we saw in discussing the affective and intellectual aspects of this ideal person—upon the formulation of ideals, of goals that are attainable, of a program that is both commensurate with and a challenge to our capacities.

Moreover, if they are to fill us with the deepest satisfactions, they must measure up to the best that is in us. For human beings have standards. Whether we go along with the moralist and speak of the force of conscience—and some moralists have given this force a supernatural origin—or whether we derive it as the psychoanalyst does from experiences of early infancy, or whether we go along with the sociologist, linking morals with mores and with one's function in a culture, does not, at this moment, matter.

What matters is that we face the fact that *every* human being possesses such a standard, call it conscience, ego-ideal, or culturally determined set of values. Dr. Edmund Bergler, a practising analyst, has recently emphasized this fact:

“To make the irony of the situation complete, people behave in general in a very arrogant and supercilious manner when conscience is mentioned. The smart and sophisticated set has only irony and scorn for it. These people be-

lieve they are 'above such nonsense.' They are *not*; *no one* is for that matter. The inner conscience functions despite conscious awareness or ignorance of it."*

In this point, at least, Bergler seems to join with Fromm in seeing symptomatic neuroses, guilt feelings, depression, anxiety, and a range of personality difficulties as rooted in this conscience.

Iconoclastic, convention-shattering, deterministic, as psychoanalysis seems to be, it is here suggesting—"The punishment for failure to actualize the best that is in you is neurosis." There is a difference, however, between the analyst and the moralist. In battling to release the productive forces in the individual the analyst is on the side of the ego, not the super-ego, nor merely the id. In this weary world of reality (it is *not* a nursery, Freud repeatedly assures us) he strives to help the individual find realistic ways of living that are not energy-destroying, pleasure-robbing, instinct-denying. And in this attempt he may find himself pitted against a phony super-ego, impossible standards, infantile prohibitions.

The value of the standards of the normal person lies in the fact that they lift his sights, holding up a high goal of accomplishment, challenging him to go through difficulties rather than around them. But they can also be fantastically high and therefore chronically punishing. And when the tension between the ego-ideal and the humble accomplishment is too great they can fill the individual with a chronic sense of guilt, of failure. Apathy and agitation are the natural outcome of such impossible standards. Either the individual grows rigid, harsh in his self-judgments, or he tends to escape into a cynicism or into one of the numerous ways of denying, outwitting, bribing, killing the voice of conscience.

Thus what we could wish for our normal self (the ideal one, again) is the realistic rather than the fantastic ego-ideal, the formulation of plans that will realize the best that is in him (with an especial emphasis upon the *in him*), goals that are congenial to his unique nature and at the same time attainable under the circumstances in which he has to live. They will not be mere compromises with an external reality, but rather the best that he can hope to attain. Yet they will still be realistic enough to fit the possible world. Here, then, is the triad we have to envisage: the best, the most congenial, the most realistic.

What *is* this self-realization? What does it mean to be one's self, or *true* to one's self, or to endeavor to actualize one's *real* self. Horney and Fromm use these phrases repeatedly, yet an element of mystery clouds their discussions.

* Edmund Bergler, *The Battle of the Conscience* (Washington Institute of Medicine, 1948), p. 12. Used by permission.

This problem plagued the dramatist Ibsen, as it has many others, and it is no mere accident that illustrations from *Brand* and *Peer Gynt* recur on their pages. We are plagued with the thought that for each individual there is some special plan—some destiny prefigured in the mind of God (or Nature) when we were placed at one particular locus in this world—that we *should* have known about, some directive that we should have listened to.

Poor Peer Gynt. He had thought that he was expressing himself all through his life, doing what he wanted to, gratifying his impulses, being his very essential self. Yet, as the older and wiser Peer reflects in the garden, as he kneels, peeling away the skins of an onion, layer after layer, the self that he had expressed was like that. No kernel, no core, no essential self. Nothing integrated, nothing whole. Instead, a mere aggregation, a mere collection, a heap of skins. The inventory of traits that a trait-psychologist could measure would be as lacking in essential unity.

Now the traditional moralist who anchors his counsel in authoritarian religion tells us that the reason for this sense of futility, for this lack of wholeness, is that we have been too selfish, that we have never anchored ourselves to something beyond the self. It has been our own little tissue-need, our own little task of tension-reduction, our own momentary craving. We have followed the pleasure-principle, the impulse of the moment, and what have we created? A heap of onion skins, a record of unimportant pleasures, or puny peccadillos. We have not even been *great* sinners. We have never stood, really, for anything—for anything, that is, beyond the tensions in our own little private field of the moment. Like the youth in the line of verse, the wind's will has been our will. We have been opportunists, pliant in the face of difficulties. Why, indeed, should we make ourselves pack horses for the needs of others, of others who are of no concern to us. (As a wit once facetiously remarked, "What has posterity done for us?") Why should we burn our bridges behind us, committing ourselves irrevocably to a course that might fail? Better to keep the way open for retreat, better to find a way around, which will not imperil our chances. Thus we shall be clever, always the master of the situation. But, as Peer Gynt found, in the tale of Ibsen, the "master of the situation" can find that, although he has won power through his Faustian bargains, his very self has deteriorated to a heap of opportunistic husks. No integrity, no kernel, no self-consistency.

But how, we say in puzzlement, how do we know what we were intended for? How were we to know at which point to stake our claim, in which ultimate direction to take our bearings? Moralists with an authoritarian anchorage profess to know; but the rest of mankind must remain puzzled. And often we are puzzled by the flexibility of the moralist's interpretation of the sacred

books in which he finds all wisdom founded. And our very ability to catch the moralist rationalizing reacts upon our own state of doubt, intensifying it. That is, if our disjointed and self-conflicting projects have developed no centering purpose, if our compromises have so obscured the meaning and significance of living, if our purely private objectives have isolated us from that broad supporting cultural stream which flows toward shared ends.

Again we are faced with the fact that some develop such centering purposes, such a fulfillment and realization of their powers, and others do not. A *normal* self (in the sense in which we have been using the term) will have the wit and creative powers to find the answer to this problem. In this second half of the twentieth century the prevalence of a faith in Science, of an attitude of wonder directed upon the new powers and claims of psychology and psychiatry, would make it easy for the unwary psychologist to assume a new authoritarian role, taking over the responsibility of deciding what the individual who consults him really should strive for. Indeed, doesn't the plain citizen imagine this is what the clinical psychologist, the vocational counselor is for? Doesn't he ask for just such advice? And isn't the psychologist tempted, by his very theories, to step into this role? Here is an individual whose anxieties have proved to be too great, whose creative forces remain bound within a repressed infantile unconscious, whose energies are scattered and disorganized. Should he not be advised, directed, provided with new centers of integration, instructed as to the one thing necessary?

Whether, with too little modesty, the psychologist or psychiatrist assumes this role and this responsibility, or with a deeper insight and a more becoming humility refuses to do more than to help the individual solve the problem for himself, will determine whether the twentieth century sees the rise of a new authoritarianism or not. Psychology could become a new "opium of the people" with its lobotomies, its facile use of tension-reducing devices, its new confessionals, its guidance centers which plot careers for those who lack the powers of choice. It could serve to reduce the number of those who know how to solve their own problems.

3. Ego and Alter: Homonomy and Autonomy

The self that we have been proposing as our ideal, with his strong ego and his strong sense of participation in and loyalty to the lives and goals of others, poses, by implication, a question that touches on one of our deepest moral conflicts. It is a conflict that runs throughout our culture, expressing itself in rival philosophies and rival styles of life.

At the very moment when our culture is rewarding and encouraging the finest flowering of the individual ego, insisting that each assume responsibility

for his own fate in a competitive struggle, extolling the glories of free enterprise, of what we call The American Way, and while in our very institutional arrangements we pit each man against his brother, we also preach altruism, social mindedness, consideration for others, public service, community spirit. And we ask for the benefits of the welfare state, social security, socialized medicine, federal aid to education, affirming the *right* of every citizen to the full development of his powers. We teach a Malthusian economics and a Christian ethics. We rationalize the competitive struggle as nature's method of insuring the survival of the fit, all the while endowing hospitals, subscribing to charities, endorsing relief measures out of our compassion for the unfit. Coöperation and competition. Egos gnawing their way into the future and thwarting other egos, yet at the same time stooping, Samaritan-like, to pick them up again. Autonomy is set up as an ideal beside homonymy and mutual aid.

Our economy is mixed, our ideals confused, our goals mutually in conflict. Looked at logically, we are strangely irrational creatures, and our lives seem to be a kind of oil and water emulsion that has never completely fused—little drops of Christian charity in a vat of corrosive greeds and hates. It is not written, of course, that human conduct should be tailored to one logically neat pattern to which we could append *quod erat demonstrandum*. In geometry, yes; but in life, no. "Give me the man," we say, "who does not obey the categories." "Praise the Lord for the little globules of compassion." But we also say, "Give me the man who can fight for his rights!"

Some egos there are who seem to attempt a resolution of this conflict by choosing altruism, renunciation, submission, sacrifice, finding their sense of integrity in devotion to others or to that cause whose furtherance never fills them with guilt, never opens them up to the charge of selfishness. Gandhi's autobiography is replete with this concern lest the flesh advance its claim, lest his egotism lead him to use force instead of love or gentle persuasion, lest intellectual pride lead him to formulate a philosophy the poor peasant could not understand. When his pupils misbehaved, *he* did the penance. When his followers got out of hand, *his* was the need to fast, to examine the roots of his guilt. "I have been a poor teacher. I have taught them to seek victory before the truth. . . ."

Other egos, as we have pointed out, seem to find joy in encroaching upon the domains of others, fattening at their expense and, like a good Kwakiutl, creating trouble all around. Instead of following the example of St. Francis and the self-denying saints, they are intrigued by the amiable psychopath, Goering, by the tough-minded Capones and Costellos. The one great immorality, Nietzsche once reminded us, is that a strong and creative ego would

be bound by the snivelling Lilliputians. The one great crime, our religious traditions warn us, on the contrary, is that a man in achieving mastery over the conditions of his life should lose the one great virtue—love. Small wonder that Nietzsche felt called upon to speak for the *anti-Christ*.

Now the solution that most of us try to imagine is one in which there is a maximum development of the ego with a minimum of damage to the alter. Such a solution implies that there is some form, some shape, some arrangement of our interpersonal relations, some organization of our needs that will permit one ego to grow and at the same time to support and abet other egos. We believe that *good* solutions are all of this type, and that, conversely, any solution that robs the ego of its strength also robs the alter of a potential supporter. Because we can actually see such good relationships in some families and in some social groupings while other relationships are full of conflict and growth-destroying antagonisms, we are forced to ask, "What are the conditions?" And, reflectively, we raise the question, "Has our society found the finest formula?" And the companion question, "Have I, as an individual, found the best balance?"

The moment we reflect upon this matter we discover a peculiar thing: apparently each one of us, a society or an individual, whatever the solution and whatever the balance of hatred and love, of coöperation and aggressive competition, feels that he has hit upon the precise formula. Wide as the range is, from passive resistance and renunciation to the atom bomb and revolution, each seems to feel that his balance is the one and only arrangement possible for a rational human being.

The clinician who stands somewhere in between the two extremes sees, on the one hand, those who have so thoroughly suppressed their natural cravings that, nature having been denied, the very strength of the ego is so weakened and warped that it is a failure even in its sacrificial labors. Yet these egos are so bound within their self-imposed limits that anxiety and intolerable guilt feelings threaten any other compromise. Compulsively good, these egos justify their abnegation and resist the clinician whose advice seems too near that of the average sensual man. In affirming their values they establish barriers against those who would help them.

At the other extreme the clinician sees the selfish ego, with its impulses to dominance, independence, control over others, so hypertrophied that the need for love, for a oneness with others, seems completely suppressed. Dr. Bergler tells the story of the husband of one of his patients (a husband who had little respect for analysis or its findings) who chanced to read in one of Bergler's books a line that ran, "Not everyone who feels sexual desire is

'overwhelmed' by tender emotions." That, he announced, was one statement he could accept. His wife urged that he read further, and he read:

"Those who doubt the existence of tender love will point out that there is a large group of men and women who never have shown signs of being truly in love. This must be admitted. But we must add at once that *these people are psychically ill, so called neurotics, in whom the inability to love is a well-known symptom.*"

But his reaction was prompt: "I don't like that sentence, I rather stick to the first one."*

Thus it is apparent that one can suppress the need for love, the need for tasks of social significance, the need for homonymy, just as one can suppress those natural id-impulses of lust and aggression arising from our very tissues. And whichever line the ego takes, and for whatever reason, it promptly strives to seal the door against doubt by rationalizing this decision. Frequently psychology itself is appealed to as the reasoner seeks to find justification for his solution in some description of the *ultimate* nature of human beings. Some will seize upon an original force of aggression (Freud's death-instinct); others will posit a will-to-power which must find expression, and so on.

The tradition of which we are a part is more prone to look upon all excesses, such as excessive aggression, which unbalance the forces within the self-system, as depending upon the material conditions of our life together. Change the world, we say. Remove the evil *conditions* and the human spirit will automatically flower, releasing and actualizing its powers without developing aggressions, without crushing others. The element of friction, of hate, the crippling influences of greed and aggression, all depend upon the arrangements, the groupings, of individuals, their access to natural goods, their humanly created insecurities. This is the central hypothesis of the Yale study called *Frustration and Aggression*, which says simply: "This study takes as its point of departure the assumption that aggression is *always* a consequence of frustration."¹⁶ The corrosive forces of evil, the aggressive thrust that destroys or cripples the chance of growth of another, these lie outside the human spirit. In society, in the family, in institutional arrangements. Change the world and you change the spirit of man. Reinhold Niebuhr once chose this theme as the title of a book, *Moral Man and Immoral Society*.¹⁷ What is man? A creature who would grow, who would realize and actualize his potentialities, who has needs that must be fulfilled. What is

* Beigler, *op. cit.*, p. 117. Used by permission.

society? It is the *bad* institutional arrangements which choke the growth impulse, which threaten our peace of mind, which arouse us to anxiety and defensive measures until in our mutual endeavors to gain security we so badly frighten one another that we distort (and then distrust) the basic motivation in our fellow men. *They* seem full of hate. But this, the "change the world" reformers assert, is illusion. Change the arrangements and insecurity and aggression will disappear.

Such was the optimism of the enlightenment, the '48-ers, the Marxians. Yet when the revolution is over, and deeds have been committed that shame our deep-lying sense of human decency, when weak human nature—not yet shaped in that paradise that is to come—attempts to administer the new forms, first there dawns the suspicion that the millennium is not yet; and then sometimes the human spirit is swept into a pessimism that sees,

Truth *forever* on the scaffold,
Wrong *forever* on the throne.¹⁸

Even Reinhold Niebuhr has retreated from his former optimistic stand to that Old Testament bulwark from which he now peers pessimistically at human nature, seeing the ancient devil within us still in need of a divine scourge if it is ever to be driven out of us.

The productive self, the self bent upon realizing to the full the possibilities within him, does not escape the moral dilemma expressed in these theories, attitudes. If we state his problem in the first person we might ask: "How can I grow, achieve productivity, express that which is in me, achieve peace of mind, and not crush others, threaten their growth, when that which is now within me is mixed, containing both love and hate; when my growth and my will threaten others, even those whom I love, when I hate masochistic weaknesses as well as selfish tyrants; when I am now half Eros, half Thanatos?"

How, indeed? How, unless we formulate the psychological problem differently than we are accustomed to? How, unless we see that our enemy is neither within nor without, but in both locations? How, unless we take the problem of family life, of institutional arrangements, of personal conduct *as a problem*, a problem to be studied with the cool objectivity of a scientist rather than as something to be justified, rationalized, glossed over, defensively solved with verbalizations.

To come down from the realm of the abstract to the realm of concrete living, would it not follow that *some* of the efforts of the psychiatrist—especially those efforts directed toward the severely inhibited patient—would be devoted to *freeing* his aggressions. There are those who, thwarted so severely, experience a hate that is only describable in the analytic lingo as

the *death wish* But these same thwarted ones cannot release this hate; indeed it threatens them both with catastrophic punishments from without and painful guilt within—especially when the one who thwarts is also one whom they love. Thus the *expression* of aggression is denied, sometimes not only the overt act but also the consciousness of aggressive wishes. But the aggressive impulse, like any unfinished tension, can persist within, churning away, affecting digestion, blood pressure, or some other vital system.

Now it is argued here that to save the patient the retaliatory forces of hate must be unlocked, that he must be brought to admit them, that they must be included in his thinking when he plans his next step. Perhaps—someone may judge—their overt expression in some recognizable form might even liquidate or at least improve a situation that has been steadily deteriorating. Thus, we sometimes hear that a clinician has warned the family that they may expect the behavior of the patient to get worse before he gets better. The paradox is that the destructive forces are released in order to also release productive ones, for the inhibited one has shown as much difficulty in performing destructive acts as in accomplishing creative ones.

This would argue that the balance of forces, the solution of the conflict, has to be made in terms of estimated outcomes. The *generalized* solutions—a compulsive elimination of aggression, compulsive elimination of love—are characteristic of the pathological extremes, rather than of the norm of health and productivity which we seek.

Our wish, for our ideal person, thus becomes: “As aggressive as he *needs* to be, no more; as full of love and the cooperative spirit as he *can* be.” And we shall always add: “Under the conditions that obtain.”

4. The Ability to Plan

To these action-traits we have described might be added a skill that becomes apparent wherever we study human efficiency. The power to organize efforts, to apply force effectively, to distribute energies wisely, is as important as our persistence or the total quantity of energy available. We find in studies of learning, for example, that there is a difference in whole methods vs. part methods, in distributed vs. massed trials. Like an engineer faced with a construction task, we are forced to make a plan which breaks up each objective into parts, man-sized blocks of work, fatigue-minimizing schedules.

This ability to plan, to organize, to allocate, to delegate, develops with experience when selves are given freedom and responsibility. That is, to a degree. And it develops more rapidly when it is consciously studied and experimentally tested.

A curious fact, often observed, is that the busiest persons, those with the

greatest responsibilities, always seem to be the ones who can take on an additional task, the ones who are undertaking some new project. The chronic worriers, the exhausted and hypochondriacal ones, always feel "terribly pressed," though they actually do little and seldom have the freedom to take up new tasks. The "bundles of energy," on the contrary, take on new responsibilities, set deadlines, divide the tasks, discharge, transform, get the job done!

How often the student is heard to sigh, "I wish that I had learned to type-write in high-school. My work would be so much simpler now. But I haven't the time to learn. I suppose that I could go to evening classes, or take lessons for a semester or summer-school, but I just can't find the time." This amount of time, one observer reports, amounts to approximately 15 or 20 minutes per day for a period of one semester. In this much distributed practice an average learner can acquire the skill of typing to the point where he can write with a machine as rapidly as he now does by hand. And beyond this semester his investment in time begins to yield efficiency-dividends as his speed increases. Yet it now seems that there is no time, simply because the wishful student thinks in terms of the total block of time required to learn and can find no place in his present busy schedule for this total amount. But there are numerous 15-minute packets available.

So some of us wish that we had time to read the classics, learn a language, make a garden, take up oil painting, cultivate a friendship, but there is no time. No time because the thin veil of our present habits screens away the clear vision of planned steps, small steps that are easily taken.

Without this ability to plan, good intentions evaporate without being transformed into reality. Without the judicious investment of energy there is no psychic income, no growth. Without the plan there is no increment in the area of freedom, for we are overwhelmed, constantly, by the burden of the unfinished, the unexpected. *Their* requirements set our schedule. The oncoming examination, the seminar paper, the homecoming game, the monthly bills, *these* do the planning; and there is no area of freedom and no sense of inner determination of things. We are always shoved about.

As in so many of these normative problems, the ideal turns out to be a middle way. Plans can be restrictive and binding to the point where they limit freedom, and the personality takes on a rigidity, an inflexibility, the undesirable qualities of a machine. The obsessive-compulsive personality, for example, so driven by anxieties and the need for security and assurance, must plan every detail in advance. The vacation itinerary must be planned down to the hour; and the unforeseen event is terribly disruptive, throwing a whole sequence awry.

So, while projecting an ideal, let us admit that plans are schedules made to be broken, when needed. They give us a point of return, a scheme to re-organize and resume, not a strait jacket which will confine and distress us. Their value is to free us, to transform the wish to reality, to discharge the unfinished business, to guarantee the maximum return on our psychological capital.

CONCLUDING OBSERVATIONS

Now this ideal person we have drawn—this creature of the sthenic mood, of the insightful understanding of himself and the world about him, this productive person with the vitalizing relations with socially significant ends, this transformer who knows how to translate plans into action—is a paragon who does not exist on sea or land. Small wonder that many psychologists have rejected the concept of the normal (as the ideal) as useless. We squirm, restlessly, even as the notion occupies our attention; and we are vaguely of the opinion that we would not like such a person as a close friend. He would make us uncomfortable. He would be too good to live with.

And yet, amusingly, he is inside our own skins. In one form or another he pounces upon us when we least expect it, commenting on our behavior. In the depressed person his comments are harsh, indeed. "You worthless creature. You'll *never* amount to anything." The rest of us dodge his judgments by a dozen adjustive devices:

We rationalize, desperately describing our behavior in terms of our good intentions, confusing our humble performance with that of an idealized self. We get busy with our knitting, or any form of busy-work, hoping that our super-ego will be impressed by our burst of energy, or bribed by the long hours we put in.

We escape into the company of good fellows, hoping to drown the voice of conscience in gay conversation, or jutterbugging.

We dream of the perfect lover who will come accepting us as we really are, proving in his or her complete adoration that our super-ego is wrong.

We even try to drown our painful realization of our shortcomings in alcohol, feeling a relief, a comfort, in the slightly muddled euphoria that arises when our cortical cells are deprived of their normal supply of oxygen.

We even risk our necks at high speeds and high altitudes, crowding out the voice in the thrill of danger and achieving a kind of integration in the face of death threats.

And there are other devices.

Yet the standard persists within us. None of the escapes from it are too successful. No one realizes how thin our rationalizations are as well as the ego who makes them. Unless our busy-work is actually oriented toward the standard and actually promotes our growth, the standard makes, in the first moment of calm, a casual judgment of the way we have been frittering away our energies. The aching head and the coated tongue add their comments to those of the super-ego on the morning after. And so it goes

Thus, one is persuaded that this "norm of conduct," which life in this culture has built in us—in one form or another—has a great deal to do with our sense of well-being, with our mental health. Without a clear perception of its shape, and its force, it seems doubtful if any one could grasp the problem of human motivation. The sthenic mood which we wished for our normal person is not merely a physiological problem, not merely a matter of the health of the cells, not merely freedom from threats that endanger our access to vital goods such as food, shelter, and a biological mate. The sthenic mood represents, also, an inner harmony, a sense of growth that is consonant with the norm, itself.

And one is persuaded that clinical judgments of the mental health of patients involve a sensing of the degree to which this inner harmony exists. In such a sensing there are at least two serious problems.

This norm, which we have tried to set up as though it were a standard that everyone in our culture could see and accept, contains dimensions that are very difficult to measure. We almost wonder whether they are measurable, at all. Certainly we do not now have good tools. The clinician often senses more than his tape-measure reveals. Much that he senses depends upon the existence *within him* of an implicit standard or norm of what a good human being is like; and the more sharply he can define this standard, and the more humanly adequate his standard is, the better clinician he will be. That is, if he also possesses an understanding of the ways and means of helping his patients to reorganize their own lives.

The second difficulty is this: As it exists, in your flesh and mine, this norm is a personal affair. Though we have all come up through a culture, the significant persons who have most deeply influenced our lives—our own fathers and mothers, our friends, our own private collection of cultural heroes who, like a host of unseen witnesses, look over our shoulder in those intervals when we seriously reflect—these particular ones (together with the unique patterns of press we have lived through) make our private super-egos just a shade different from those of any other person.

This realization of the uniqueness of the standard, the uniqueness of the life space and its goals, and hence of the uniqueness of the task of self-

development for each of his patients, must come to the good clinician. He cannot, he should not, in thick-skinned insensitivity, impose his own goals upon another. Although he may have worked out his own solution to the problem, he has to look upon each life as a kind of experiment with truth. It is possible that he can teach some of the methods, some of the rules, but as surely as he does not control the quantities that are *given* in any personal equation, he does not have, in advance, a book of answers. The responsibility for orienting himself upon the psychological map returns to the individual, himself.

REFERENCES

1. Norman Cameron, *The Psychology of the Behavior Disorders* (Houghton Mifflin Company, 1947).
2. William Graham Sumner, *Folkways* (Ginn and Company, 1906), Chapter XV.
3. Clark L. Hull, "Moral Values, Behaviorism, and the World Crisis," *Transactions of the New York Academy of Sciences*, Ser. II, Vol. 7, No. 4, pp. 90-94.
4. George Kimmelman, "Moral Maturity and Psychology," *American Journal of Orthopsychiatry*, 18 (1948), pp. 552-554.
5. Richard Crossman (ed.), *The God That Failed* (Harper & Brothers, 1949).
6. R. E. L. Faris and H. W. Dunham, *Mental Disorders in Urban Areas* (University of Chicago Press, 1939).
7. See Fromm's discussion of the marketplace personality in *Man for Himself* (Rinehart & Company, Inc., 1947).
8. Karen Horney, *Neurosis and Human Growth* (W. W. Norton & Company, Inc., 1950).
9. Friedrich Nietzsche, *Beyond Good and Evil* (The Macmillan Company, 1925).
10. Crane Brinton, *Nietzsche* (Harvard University Press, 1941).
11. Romain Rolland, *Jean Christophe*, Vol. II, p. 64 (Henry Holt & Company, Inc., 1915).
12. OSS Assessment Staff, *The Assessment of Men* (Rinehart & Company, Inc., 1948).
13. Lewis M. Terman and Milta H. Oden, *The Gifted Child Grows Up* (Stanford University Press, 1947).
14. Matthew Arnold, Sonnet 2, "To a Friend."
15. Arnold, "The Function of Criticism," in *Essays in Criticism* (Oxford University Press, 1914), p. 35.
16. Yale University, Institute of Human Relations, *Frustration and Aggression*, by John Dollard, et al. (Yale University Press, 1939).
17. Reinhold Niebuhr, *Moral Man and Immoral Society* (Charles Scribner's Sons, 1932).
18. James Russell Lowell, "The Present Crisis."

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